

EAGLE TUGS



RTT-18 PARTS & SERVICE MANUAL 2050 COMPLIANT



Vehicle Type: RTT-18
Motor Type: AC ELECTRIC

This page was intentionally left blank

INTRODUCTION

From everyone at Eagle Tugs, we would like to say Thank You for purchasing an Eagle RTT-series tow tractor. We take a lot of pride in the quality of the products that we build, as well as our continued customer service. Our goal is to build a long term relationship with our customers. We want you, the customer, to be 100% satisfied with your Eagle experience. To us, this means that your Eagle RTT-series tractor is functionally superior to any other products you have used. This also means that your Eagle product is continually supported in a professional, timely manner.

PURPOSE & USE OF THIS MANUAL

This manual is designed as a reference guide to make the reader more familiar with the components of the Eagle RTT tow tractor model. This manual includes part numbers and descriptions to assist the reader in ordering component spare/service parts. The manual also outlines the Scheduled Maintenance Intervals recommended by Eagle in order to keep your vehicle running properly. In this manual you will also find the Eagle Standard Warranty on the RTT-series tow tractor. However, for more detailed information on the Eagle Warranty and procedure, as well as information pertaining to the safe operation of your Eagle product, please see the Eagle Operations Manual that was also included with your tow tractor.

TECHNICAL ASSISTANCE

When addressing a repair procedure or operational problem, please remember that Eagle technical support is only a phone call away. Eagle technicians are available to assist you in vehicle diagnostics and recommended repair procedures. We encourage you to use this service to reduce machine down-time and to gain a better understanding of proper repair procedures.

ORDERING SPARE/SERVICE PARTS

Eagle inventories the component parts found in its RTT-series tow tractors, and most spare/service parts can be shipped the same day the order is received. Parts orders need to be received at Eagle by 12:00 pm (Noon) EST in order for the parts to be shipped that same day. Parts ordered after 12:00 pm EST will most likely be shipped the following day.

CONTACT INFORMATION

Eagle Corporate Office

26111 Northline Rd
Taylor, MI 48180
(800) 671-0431
www.eagletugs.com

Customer Service

customerservice@eagletugs.com
(734) 442-1000 -- (800) 671-0431

Parts & Service

parts@eagletugs.com
(734) 442-1000 -- (800) 671-0431

Technical Support

support@eagletugs.com
(734) 442-1000 -- (800) 671-0431

TABLE OF CONTENTS

WARRANTY	6
Vehicle ID Information	6
Warranty Registration.....	6
Warranty Information	7
SERVICING PROCEDURES	8
Resetting PM Hours Instruction	8
HST & Optical Display Error Messages.....	9
SERVICE PARTS ILLUSTRATIONS & DETAIL	
IDENTIFICATION KEY.....	10
HEAD LIGHT, TAILAMP AND BEACON POLE	11
Headlight, Taillamp & Beacon Pole Assembly	11
Beacon Pole Mounting Assembly	12
BRAKES, WHEELS & TIRES	13
Rim & Tire Assembly	13
Parking Brake Bracket Assembly.....	14
Brake Line Tee Assembly.....	15
Brake Assembly Service Parts	16
DRIVE CABLES	17
Motor Drive Lead Cables.....	17
AXLES & SPRINGS.....	18
Mounting Shaft Assembly	18
Spring Assembly	19
Newage Axle Breakdown.....	20
Newage Axle	21
Axle Service Parts	22
BATTERY.....	26
Battery Plug Assembly & Jumper Cable for Contactor	26
STEERED CASTER & ACCELERATOR	27
Caster Assembly	27
Front Wheel and Tire	28
Accelerator Pedal Assembly.....	29
STEERING SYSTEM & HORN	30
Horn Assembly	30
Steering Box Assembly.....	31
Steering Column	32
Steering Column Assembly	33
Steering Column Support	34
CYLINDER ASSEMBLY	35
Master Cylinder Assembly.....	35
ELECTRICAL.....	39
Electrical Component Assembly.....	39
Instrument Panel Assembly	41
OTHER ASSEMBLIES.....	42
Seat Assembly	42
Towbar Assembly	47

TABLE OF CONTENTS

Rear Hitch Assembly48

Front Hitch Assembly49

Chassis Components50

Switch Mat51

Wiring Diagram52

Revision Log54

WARRANTY

VEHICLE ID INFORMATION

This information can be found on the tractor's I.D. Plate located on the fender left of the driver's seat. Additionally, there is a permanent serial number located on the front chassis plate inside the steering compartment.

MODEL

SERIAL #

MFG DATE

WARRANTY REGISTRATION INFORMATION

Please visit Eagle Tugs website at www.eagletugs.com and fill out your warranty registration information.

NOTE: At the time a warranty claim is filed it may be necessary for Eagle Tugs to request a copy the maintenance records kept on your tug. For your convenience a printable Preventative Maintenance Schedule page is available in the Maintenance section of this manual.

WARRANTY

WARRANTY INFORMATION

Please read the Eagle Tugs warranty statement (available on our website) carefully.

When contacting Eagle Tugs for warranty or parts service, please have the following information ready:

- Tractor model number
- Tractor serial number
- Current hour reading

SERVICING PROCEDURES

See the attached appendix for Preventive Maintenance schedule.

Instructions for Resetting the PM Hours on an RTT Using The OPT10

1. Press * and then enter 555 (hourglass) as the password
2. Select menu item #4 PM RESET from the menu using up and down arrows
3. Click the right arrow to enter the menu
4. Select RESET PM HOURS from the menu using up and down arrows
5. Click the right arrow to enter the menu
6. Using the up and down arrows to change the digits and the right and left arrows to select digits, set the code to 026111
7. Press * to reset the PM

For RTT Without OPT 10:

Items Needed

1. OPT10
2. Connection wire for each RTT
 - A. Insert wire into pin #31 on VCM-20 plug
 - B. Use OPT 10 to reset PM or for diagnostics (see instructions above)

SERVICING PROCEDURES

EAGLE RTT-HST AND OPTICAL DISPLAY ERROR MESSAGES

VMC20 DETECTED ERRORS	ERROR MESSAGE
1 OR 257	ACCELERATOR PEDAL PRESSED AT KEY ON
1 OR 513	DIRECTION SWITCH ACTIVE AT KEY ON
2	BOTH DIRECTION SWITCH INPUTS ON
3 OR 259	TRACTION POT OUT OF RANGE
3 OR 515	TRACTION SWITCH OUT OF ADJUSTMENT
4	UNDervOLTAGE
4 OR 260	ACS UNDervOLTAGE
5	OVERVOLTAGE
5 OR 261	ACS OVERVOLTAGE
6	CAN ERROR
ACS DETECTED WARNINGS	
11 OR 267	WARNING HEATSINK TEMPERATURE LOW
12 OR 268	WARNING HEATSINK TEMPERATURE HIGH
13 OR 269	WARNING MOTOR TEMPERATURE HIGH
14 OR 270	WARNING HEATSINK TEMPERATURE SENSOR NOT CONNECTED
15 OR 271	WARNING MOTOR TEMPERATURE LOW
16 OR 272	WARNING MOTOR TEMPERATURE SENSOR NOT CONNECTED
17 OR 273	WARNING SPEED SENSOR
18 OR 274	WARNING DC BUS HIGH
19 OR 275	WARNING DC BUS LOW
20 OR 276	WARNING ACS UNDEFINED
ACS DETECTED ERRORS	
21	EMERGENCY SHORT CIRCUIT
22	EMERGENCY HEATSINK OVER TEMPERATURE
23	EMERGENCY MOTOR OVER TEMPERATURE
24	EMERGENCY CURRENT SENSOR ERROR
25	EMERGENCY NO CHARGE ON DC BUS
26 OR 282	EMERGENCY TRACTION NOT FOUND
26 OR 538	EMERGENCY PDO TIMEOUT
26 OR 794	EMERGENCY SDO FAIL
26 OR 1050	EMERGENCY CAN TIMEOUT
27	EMERGENCY UNDER VOLTAGE
28 OR 284	EMERGENCY OVER VOLTAGE SOFTWARE DETECTED
28 OR 540	EMERGENCY OVER VOLTAGE HARDWARE DETECTED
28 OR 265	EMERGENCY PCB OVER TEMPERATURE
29 OR 521	EMERGENCY ACS UNDEFINED

NOTE: DEPENDING ON HOW THE ERROR IS READ YOU MAY SEE
THE 8 BIT ERROR CODE (0-255) OR THE FULL ERROR CODE.

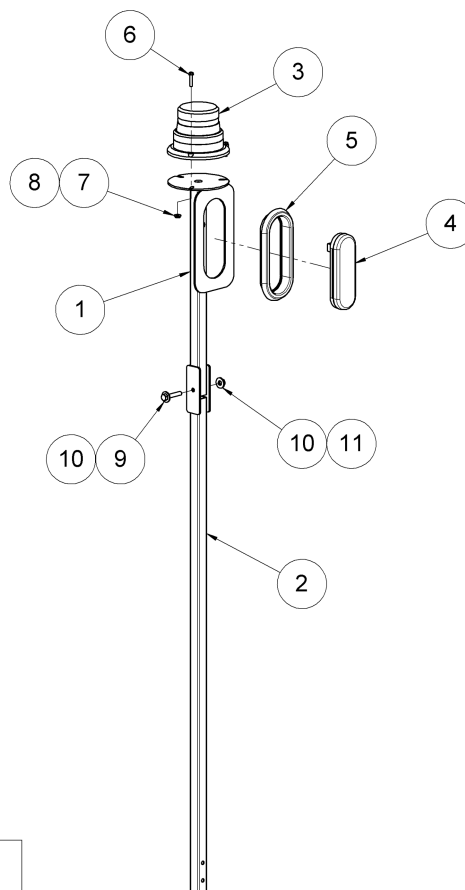
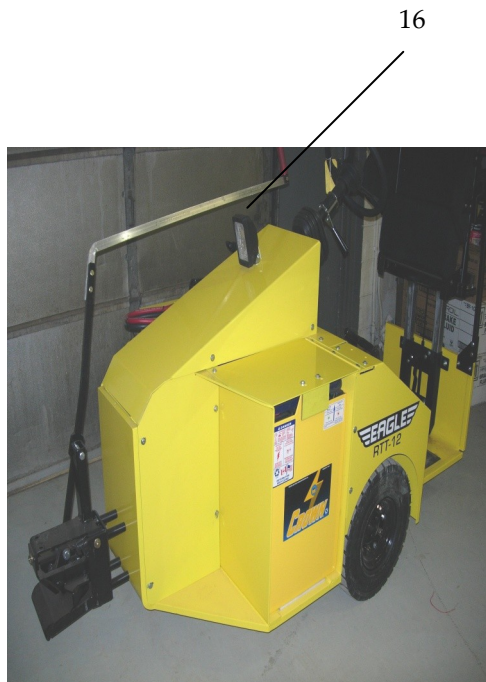
SERVICE PARTS ILLUSTRATIONS & DETAIL

IDENTIFICATION KEY

The following abbreviations are used throughout the parts lists in this section.

Abbreviation	Meaning	Purpose
NL	Not Listed	Part required but not shown on diagram
NPN	No Part Number	Parts shown and numbered, but not stocked and sold by Eagle. Typically used for bolts, clamps, etc...
AR	As Required	

HEADLIGHT, TAIL LAMP & BEACON POLE ASSEMBLY



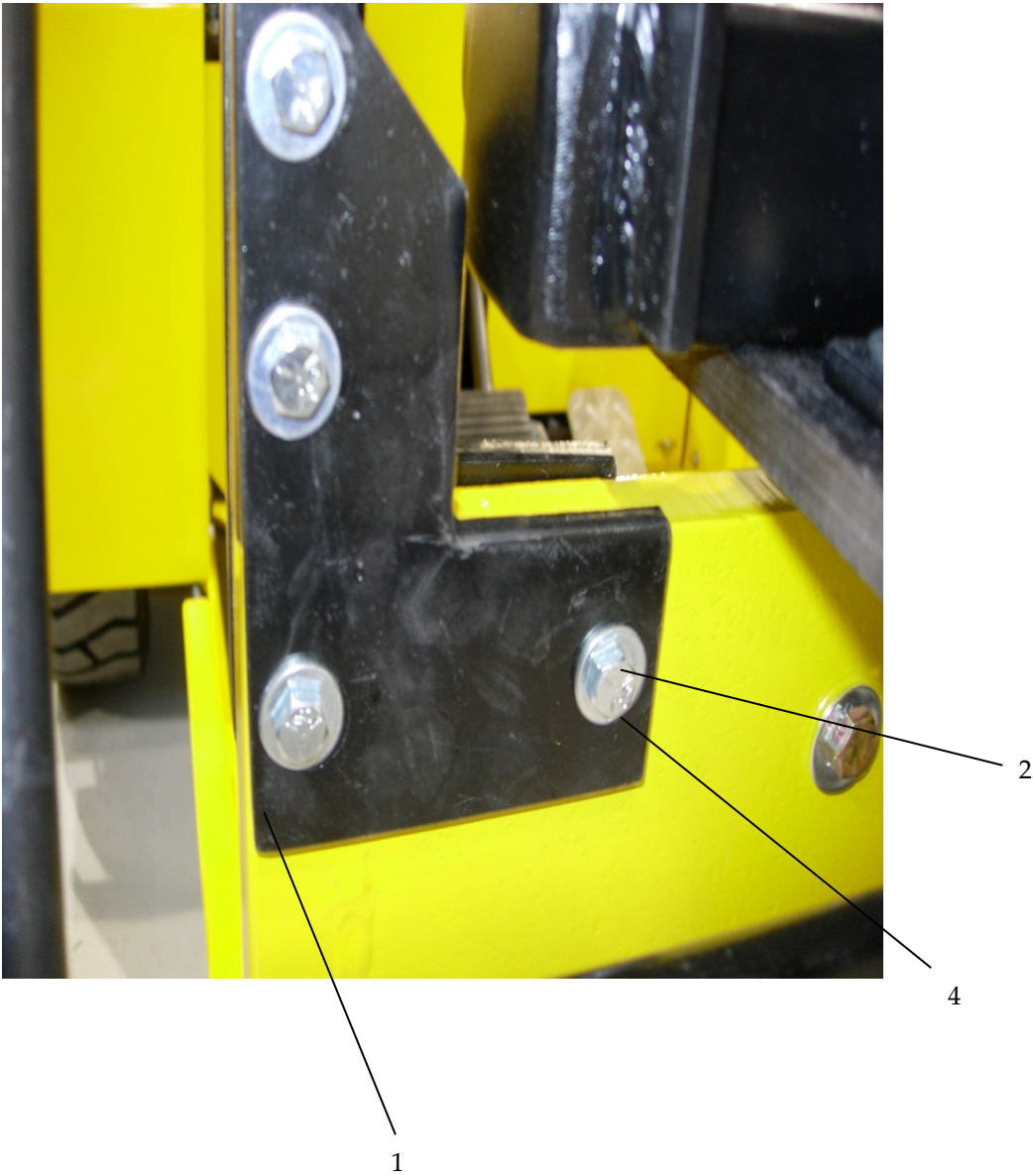
ITEM 3 TO BE WIRED AS SHOWN BELOW

DEUTSCH	1	(BLK)	BEACON, LED A-RTT12-00294
DTM04-2P	2	(WHT)	

Item	Part Number	Qty	Description
1	A-RTT12E-00293 / A-RTT12E-00296	1	BEACON POLE TAIL LIGHT BRACKET (SOLD AS WELDMENT ONLY)
2	A-RTT12E-00298	1	BEACON POLE TUBE
3	A-RTT12-00294	1	LED BEACON
4	A-RTT12E-00292	1	STOP/TAIL LAMP
5	A-RTT12E-00287	1	TAIL LIGHT GROMMET
6	NPN	3	HCS, #10-32 UNF X 1
7	NPN	3	FLAT WASHER, #10
8	NPN	3	LOCK NUT, #10-32 UNF
9	NPN	1	HCS, 5/16-18 UNC X 1.75
10	NPN	2	FLAT WASHER, 5/16
11	NPN	1	LOCK NUT, 5/16-18 UNC
12	RT00-05-001-SA	1	BEACON POLE WIRE HARNESS (S/N 1817 AND LATER)
13	DTM04-2P	1	STROBE CONNECTOR (WHEN EQUIPPED WITH ITEM 12)
14	WM2P	1	STROBE CONNECTOR LOCK (WHEN EQUIPPED WITH ITEM 12)
15	0460-202-20141	2	STROBE CONNECTOR PINS (WHEN EQUIPPED WITH ITEM 12)
16	A-RTT12E-00291	1	HEADLIGHT

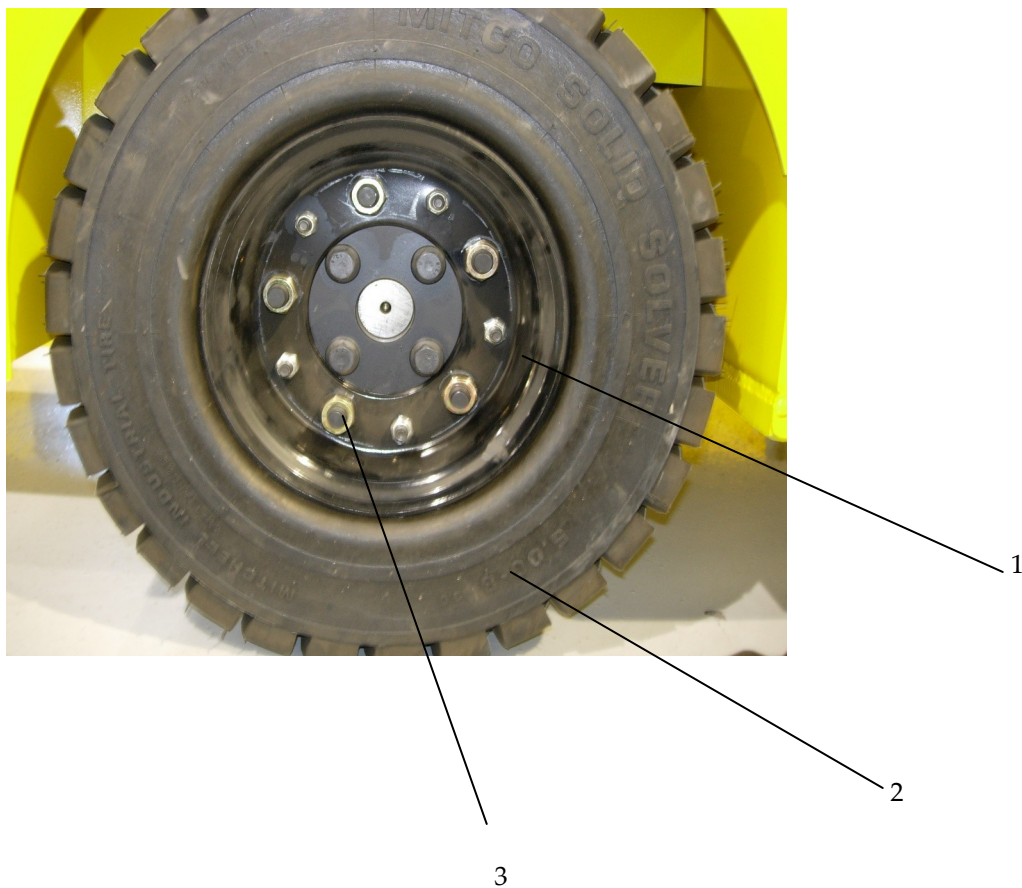
* Note: Part # 11-12, 14 must be purchased as fabricated.

BEACON POLE MOUNTING ASSEMBLY



Item	Part Number	Qty	Description
1	A-RTT12-00297	2	BEACON POLE BOTTOM MOUNTING BRKTS
2	1/4-20X2 G5 HCS	4	HCS
3	AE-OPT-0036-21G	4	1/4-20 LOCK NUTS (NOT SHOWN)
4	1/4 INCH	8	FLAT WASHERS

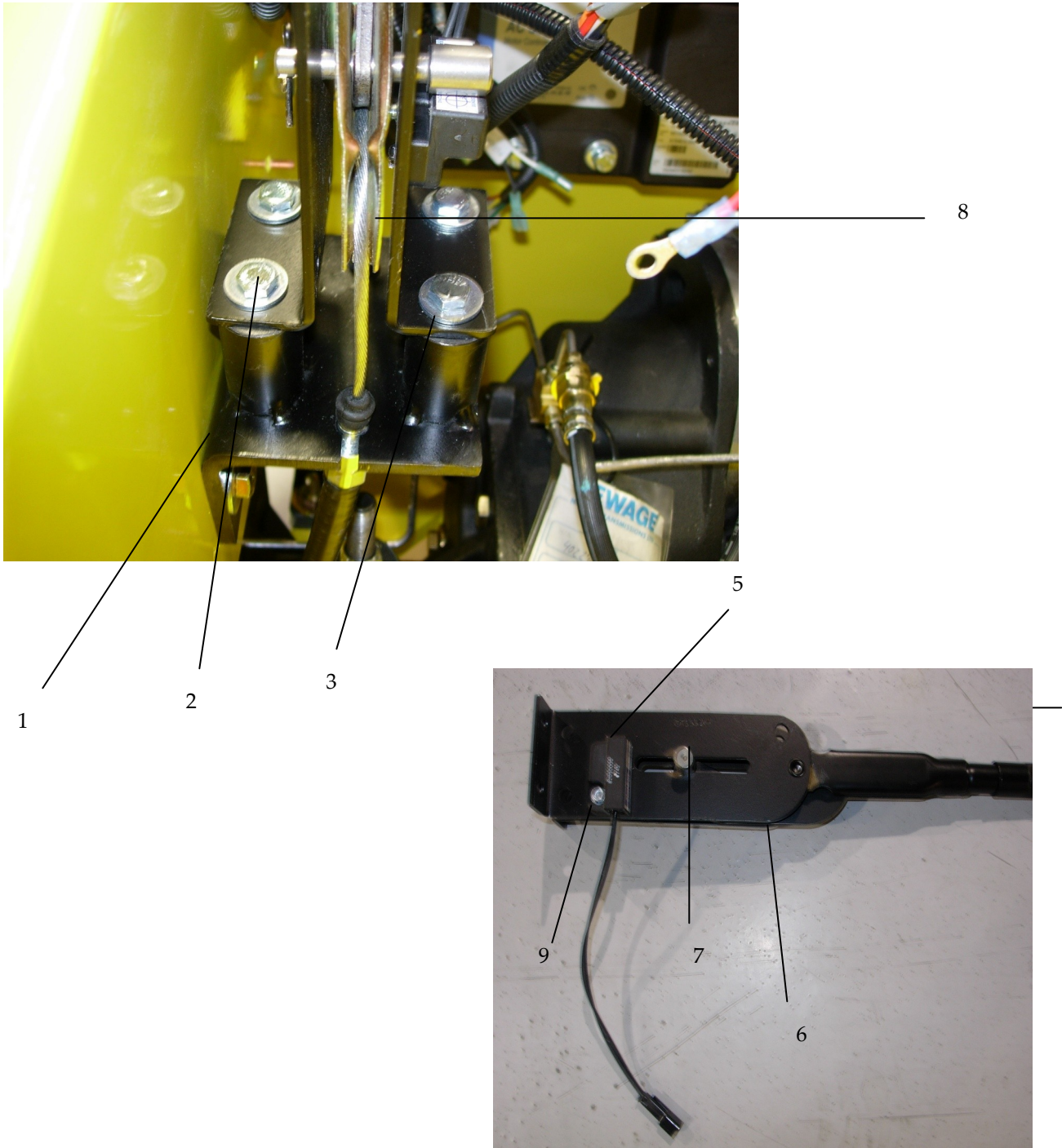
REAR RIM AND TIRE ASSEMBLY



Item	Part Number	Qty	Description
1	A-RTT-00122-1	2	2 PIECE WHEEL/RIM
2	A-RTT-00121-1	2	500X8 TIRE
3	A-RTT12-00123	10	LUG NUTS RTT12

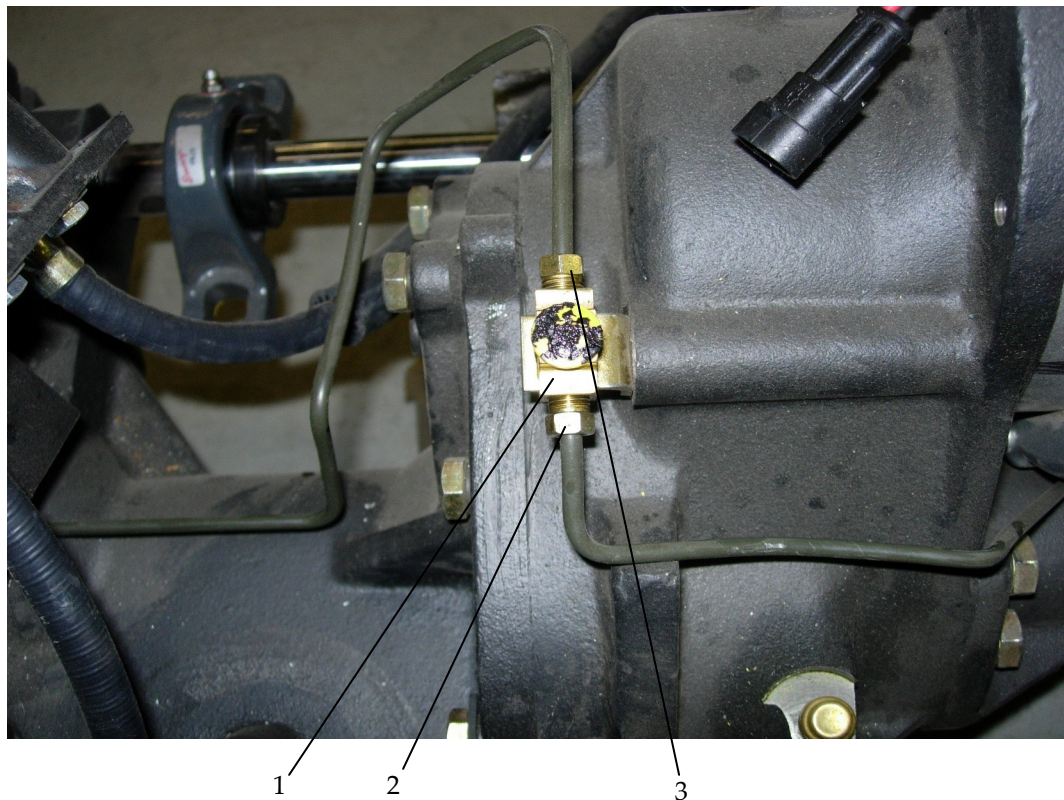
* Option: Soft Shoe Tires Available Upon Request. Tire & Rim Not Sold Separately.

PARKING BRAKE BRACKET ASSEMBLY



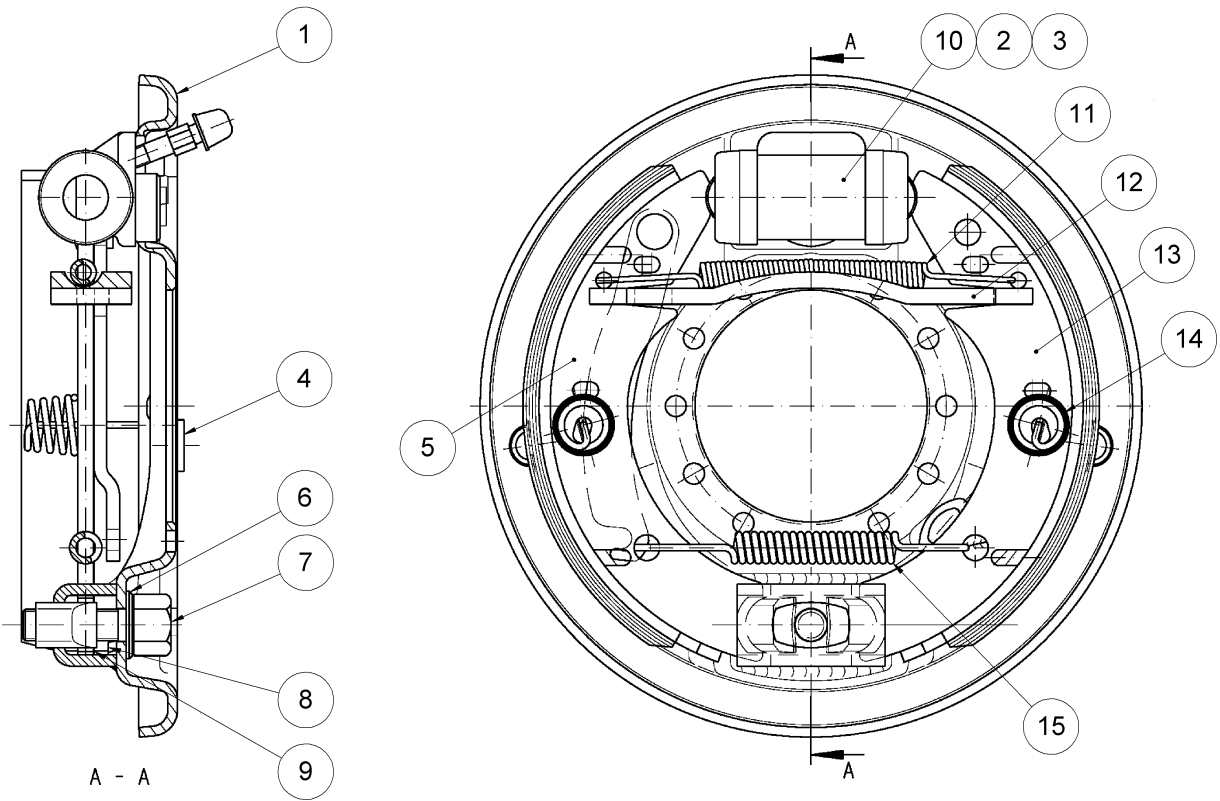
Item	Part Number	Qty	Description
1	A-RTT12-00142	1	PARK BRAKE BRACKET
2	1/4-20X2.5 G5 HCS	4	BOLT
3	1/4	8	FLAT WASHER
4	1/4-20	4	LOCK NUT(NOT SHOWN)
5	82050000	1	PROXIMITY SENSOR/SWITCH
6	A-TT4-00141	1	PARKING BRAKE HANDLE
7	81008429	1	CONTACT PIN
8	90-2511	1	PARKING BRAKE CABLE
9	82050000	1	MOUNTING SCREW

BRAKE LINE TEE ASSEMBLY



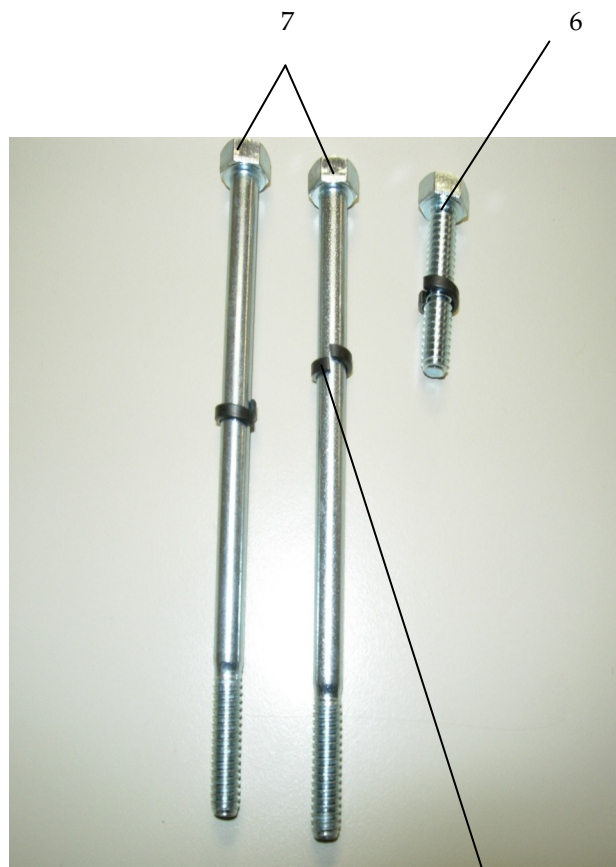
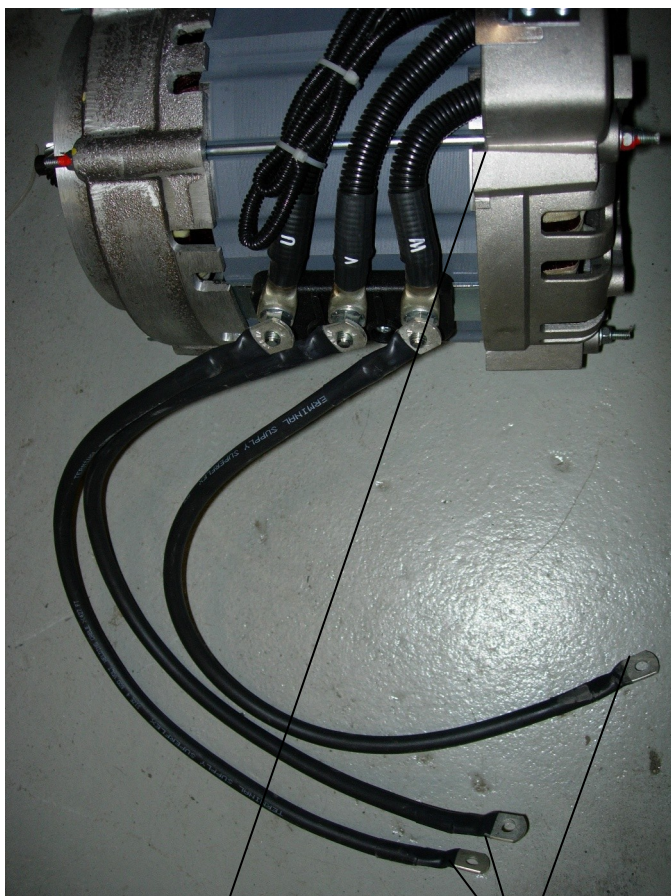
Item	Part Number	Qty	Description
1	A-TT4-00168	1	BRAKE LINE TEE
2	A-RTT12-00171	1	RIGHT BRAKE LINE
3	A-RTT-12-00169	1	LEFT BRAKE LINE

BRAKE ASSEMBLY SERVICE PARTS



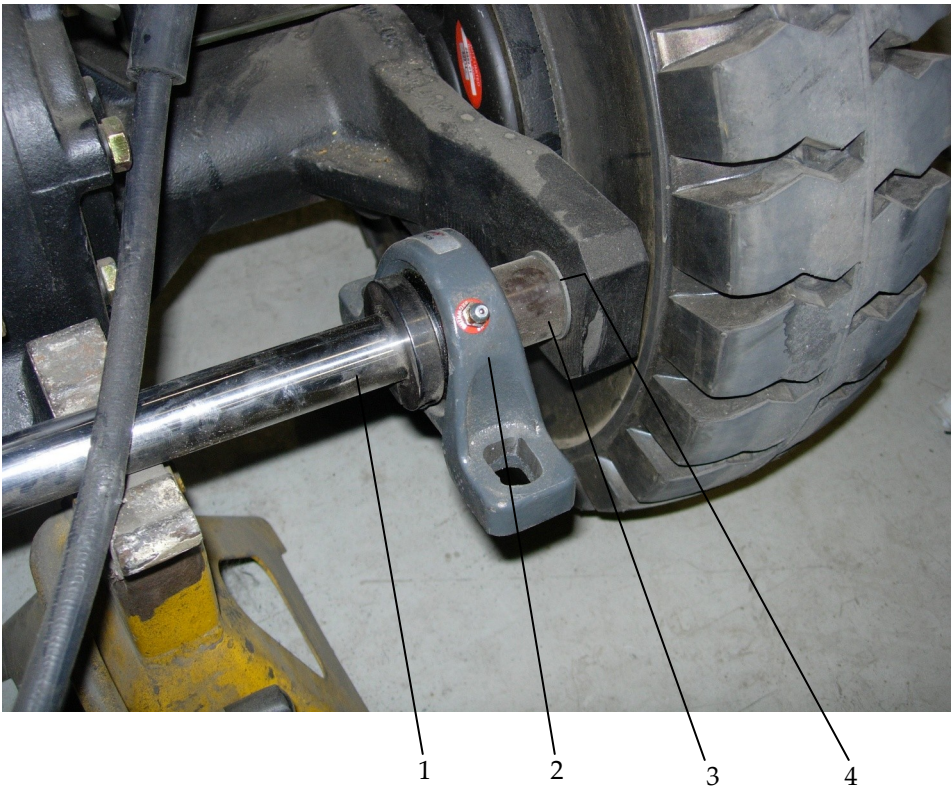
Item	Part Number	Qty.	Description
1	24868.01	2	BACKING PLATE
2	D7980.002	4	SPRING WASHER, DIN 7980
3	D912.033	4	SHCS, M6 X 10, GALV
4	44569.03	4	PIPE PLUG
5	35161.01	2	BRAKE SHOE (WITH LEVER)
6	D125.004	2	WASHER, B10.5
7	45229	2	HCS, M10 X 34
8	45200	4	ADJUSTER BLOCK
9	44826	2	READJUSTER BLOCK
10	44015	2	WHEEL CYLINDER
11	43351	2	TENSION SPRING
12L	43352.01	2	BRAKE TAPPET, LH
12R	43352.02	2	BRAKE TAPPET, RH
13	35162.01	2	BRAKE SHOE (WITHOUT LEVER)
14	42861.01	4	COMPRESSION SPRING
15	45531	2	TENSION SPRING

MOTOR & DRIVE LEAD CABLE SET ASSEMBLY



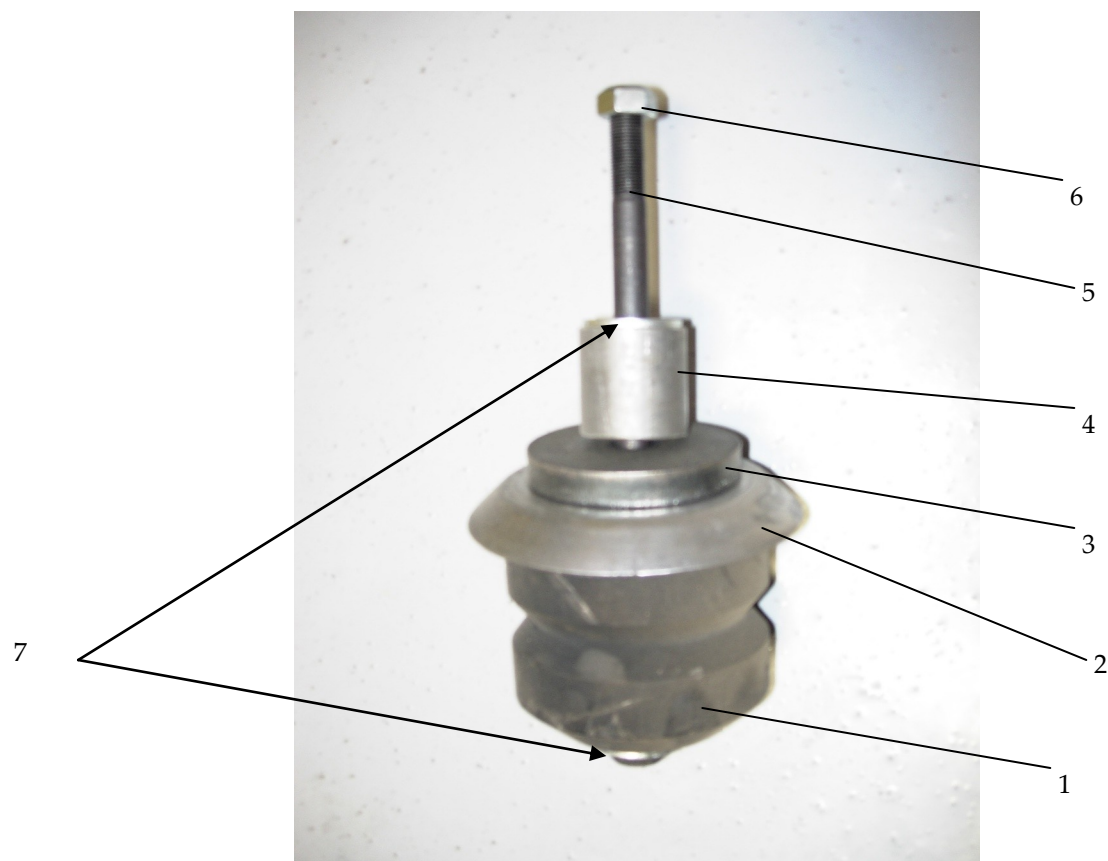
Item	Part Number	Qty	Description
1	A-RTT12-00410-B	3	MOTOR DRIVE LEAD CABLES
2	A-RTT-00365-1	1	DRIVE MOTOR WITH GEAR
3	A-RTT-00365-A (Not Shown)	1	NON SENSOR DRIVE BEARING
3A	A-RTT-00365-B(Not Shown)	1	O-RING NON SENSOR BEARING
4	H100010 KIT 1	1	REPAIR KIT W/ BOTH BEARINGS
5	H100010 KIT 4	1	REPAIR KIT W/ BEARINGS & ROTORS
6	8MM-1.25X 30 HCS 8.8	1	MOTOR MOUNTING BOLT
7	8MM-1.25X 110 HCS 8.8	2	MOTOR MOUNTING BOLT
8	8MM- COLOR LOCK WASHER	3	LOCK WASHER

AXLE MOUNTING SHAFT ASSEMBLY



Item	Part Number	Qty	Description
1	A-RTT12-00110	1	MOUNTING SHAFT
2	A-RTT12-00100	2	PILLOW BLOCK
3	A-RTT12-00329	2	SPACER
4	A-RTT12-00151	2	FLANGE BUSHING

SPRING ASSEMBLY



1	A-RTT12-00116	2	SPRINGS
2	A-TN4-00115E	2	STEEL CUP
3	A-RTT12-00117	2	WASHER
4	A-RTT12-00328	2	SPRING SPACER
5	A-RTT12-00101	2	AXLE MT BOLT 1/2-20X10 G8 HCS
6	1/2 x20	2	LOCK NUTS
7	AE-OPT-0036-21C	2	1/2 FLAT WASHER

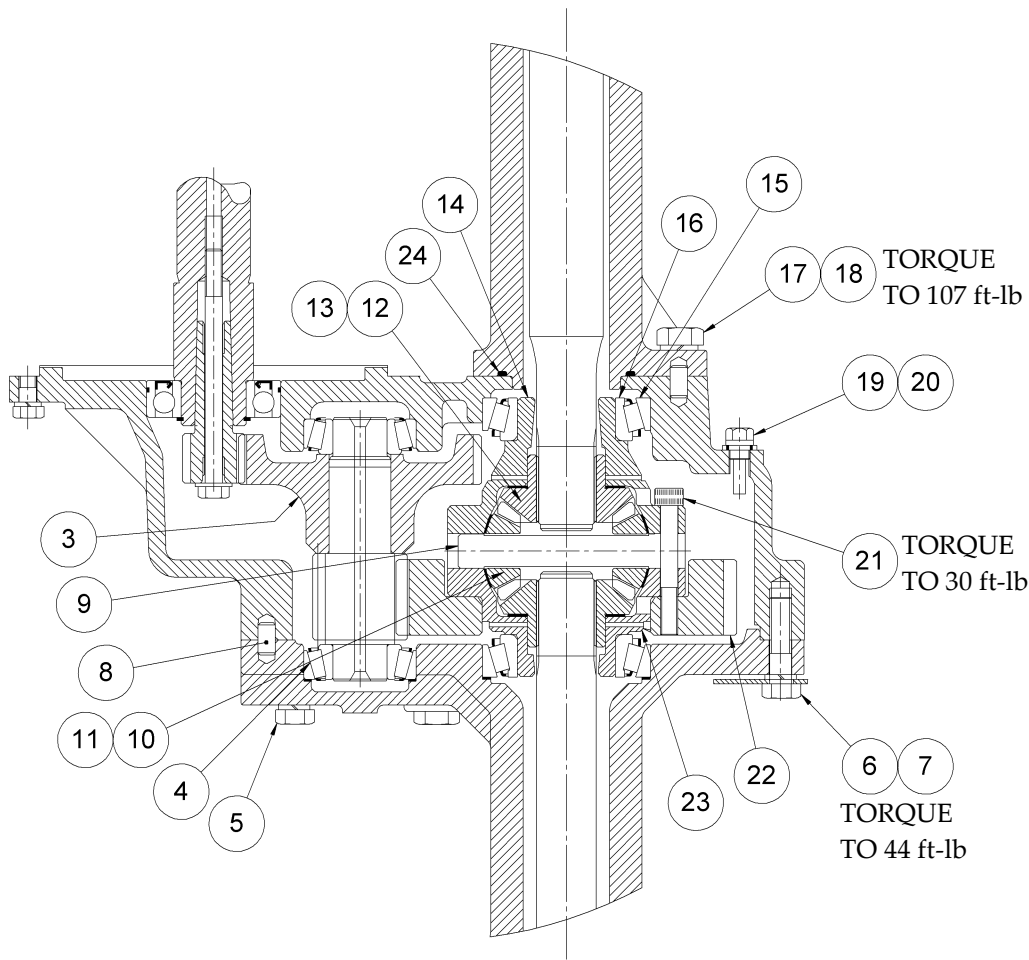
This page intentionally left blank.

NEWAGE AXLE

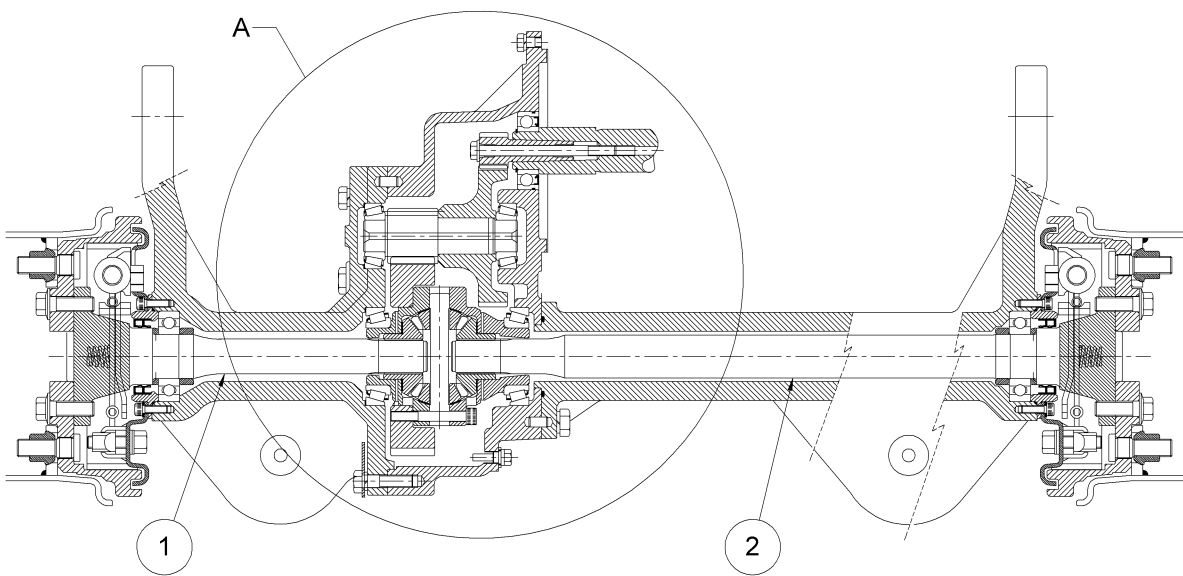


Item	Part Number	Qty	Description
1	A-RTT-00361	1	NEWAGE AXLE
2	90-0450	10	WHEEL STUDS

AXLE SERVICE PARTS



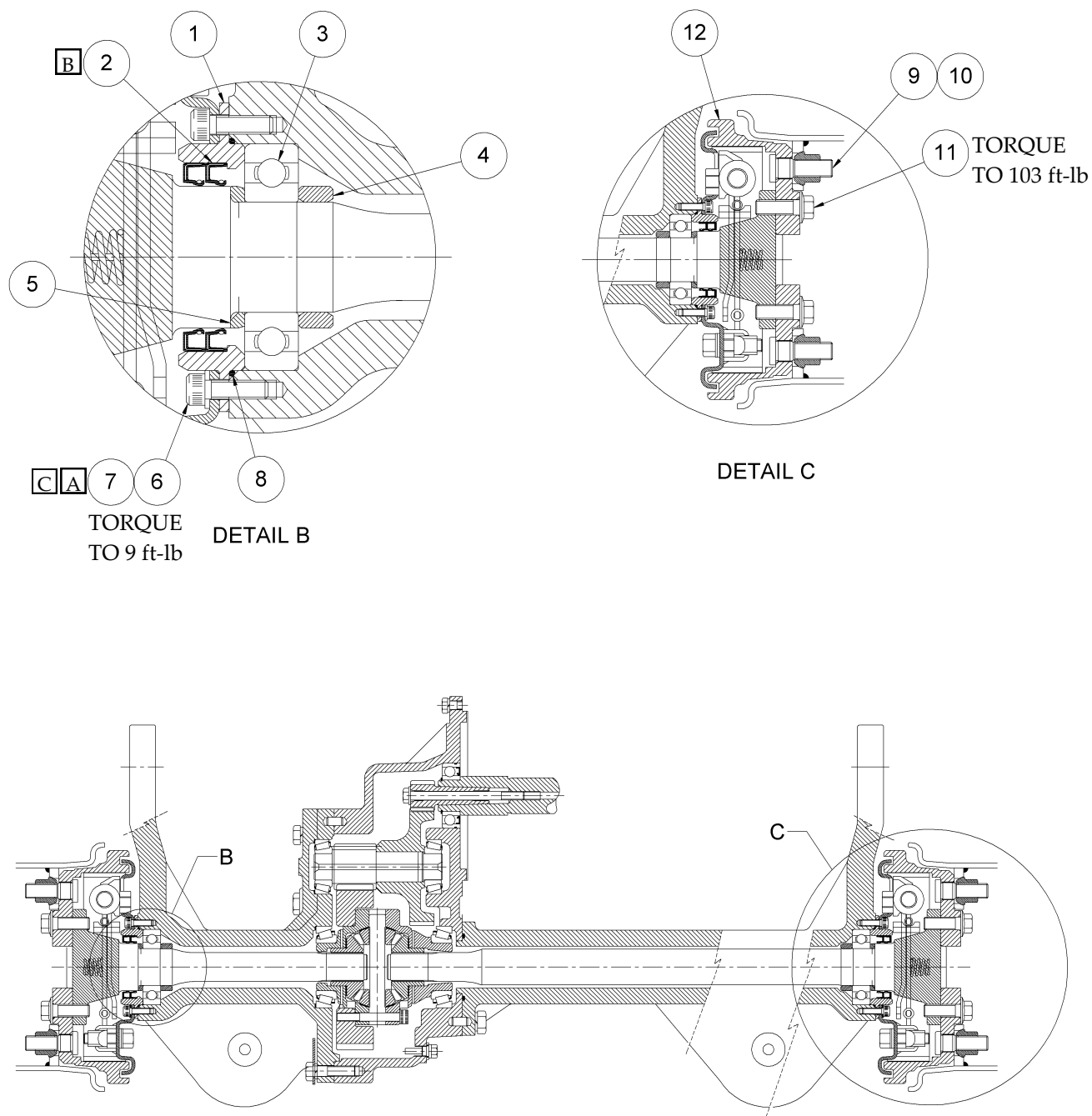
DETAIL A



AXLE SERVICE PARTS

Item	Part Number	Qty.	Description
1	90-0100	1	AXLE SHAFT SHORT
2	90-0101	1	AXLE SHAFT LONG
3	90-2680	1	PRIMARY WHEEL
4	0540253	2	TAPER BEARING
5	0041013ZP	2	BOLT ZINC, GD8, M10 X 50 LG
6	0041011ZP	7	BOLT ZINC, GD8, M10 X 40 LG
7	0191006	9	FLAT WASHER, M8
8	0210815	2	DOWEL, 8 X 15 LG
9	90-2130	2	DIFF SPIDER
10	360-2100	4	DIFF PINION
11	250-2120	4	THRUST WASHER
12	250-2110	2	THRUST WASHER
13	360-2090	2	DIFF WHEEL
14	90-2080	1	DIFF CASE RH
15	055U049	2	BEARING CUP
16	055C028	2	TAPER BEARING
17	0191107	6	SPRING WASHER, M12
18	0041211ZP	6	BOLT ZINC, GD10, M12 X 40 LG
19	CP1224	1	BONDED SEAL, 1/8" BSP
20	GW1061	1	MAGNETIC PLUG
21	0081460L	12	HCS, M8 X 60 LG
22	90-2660	1	OUTPUT WHEEL
23	90-2070	1	DIFF CASE LH
24	0430693	1	O-RING, FACE SEAL

AXLE SERVICE PARTS



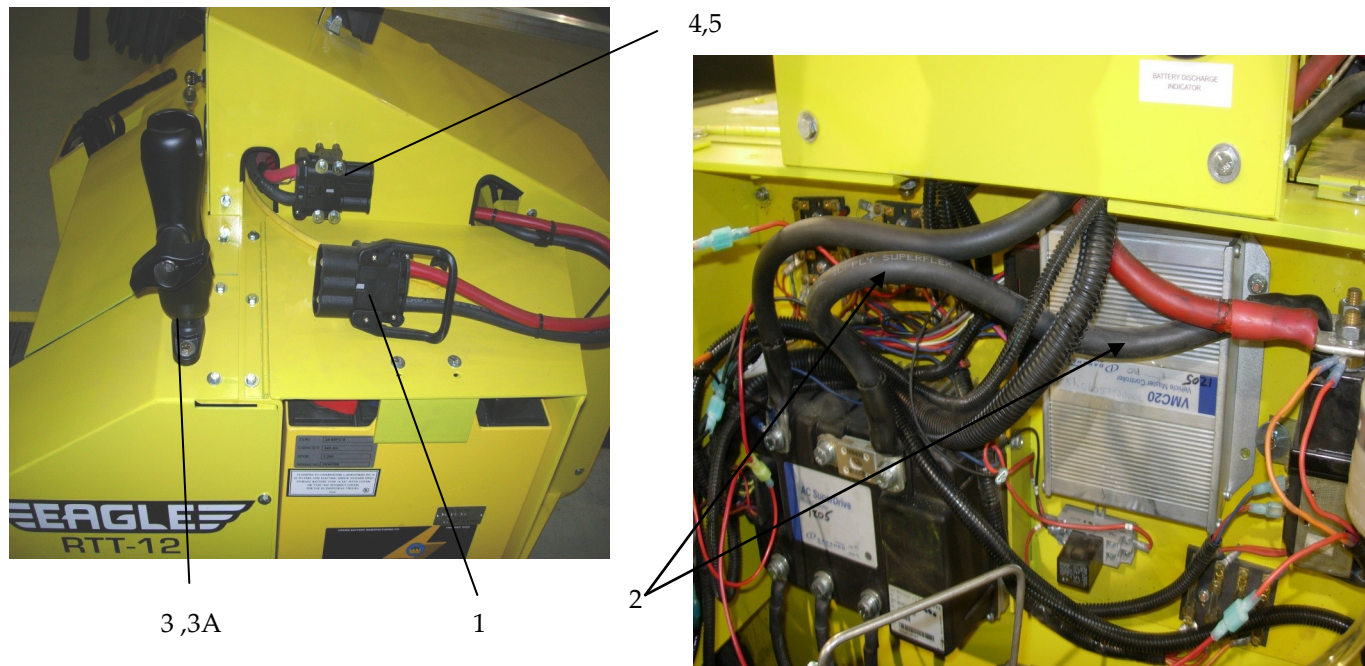
- A** Install specified components using Loctite® Threadlocker 243™ or 245™ thread retaining compound or comparable.
- B** Oil seals face same direction. Pack grease between oil seals.
- C** No washer fitted under screw adjacent to brake adjuster.

AXLE SERVICE PARTS

Item	Part Number	Qty.	Description
1	90-2730	2	SEAL HOUSING
2	0400453	4	OIL SEAL 45 X 60 X 7
3	0513540*	2	SUPER PRECISION BALL BEARING
4	90-2142	2	COLLAR BEARING RETAINER
5	90-2141	2	BEARING SPACER
6	0191004S	20	PLAIN WASHER, M6
7	0081320/G10	22	HCS, M6 X 20 LG
8	0430721	2	O-RING DOWTY
9	90-0170	10	PITCH NUT, M14 X 1.5
10	90-0450	10	WHEEL STUD, M14 X 1.5
11	01207035	8	HCS, M12-1.75 X 35
12	90-0541	2	BRAKE DRUM

* Substitution of alternative bearings will result in reduced life and possible axle damage.

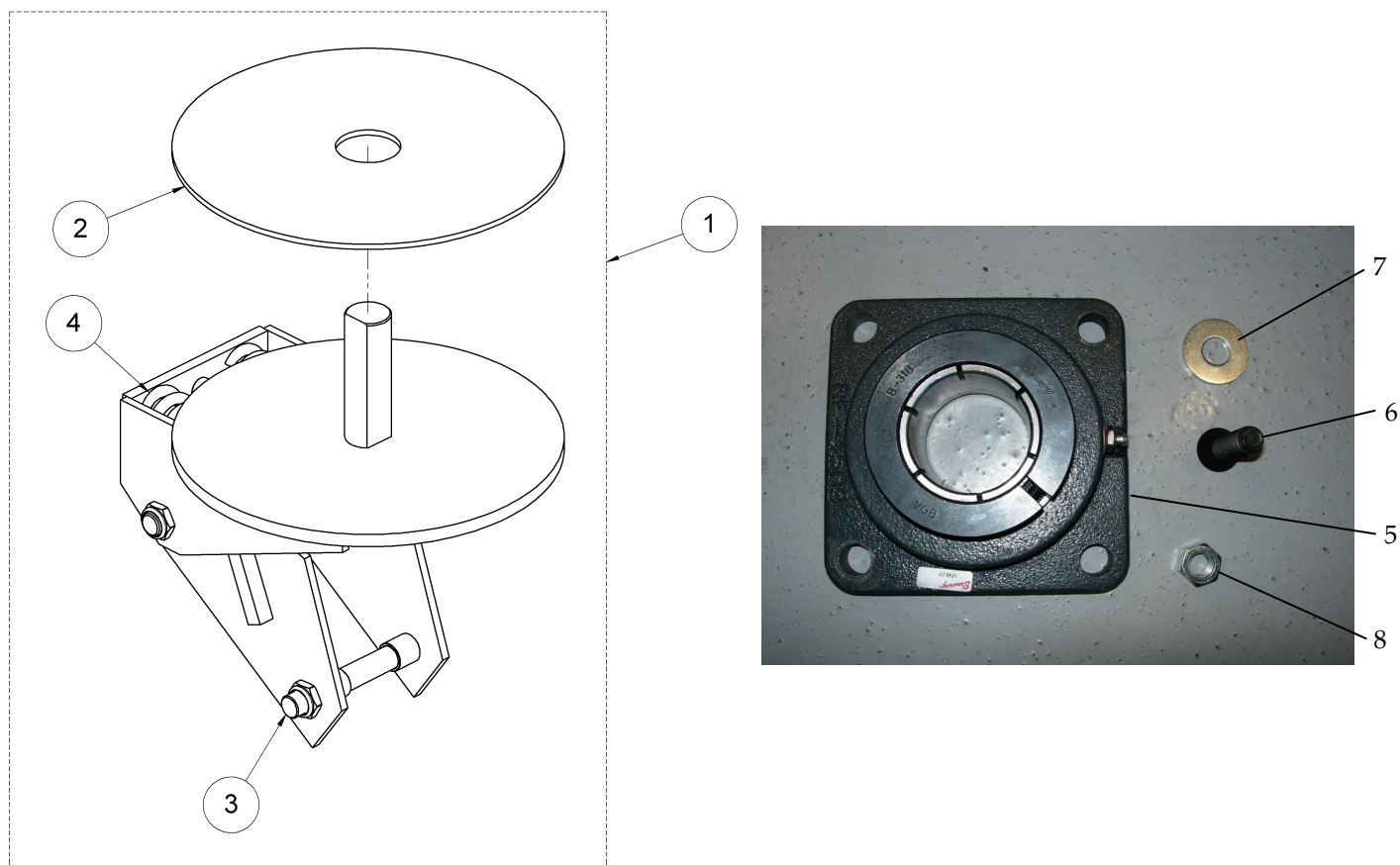
BATTERY PLUG ASSEMBLY



Item	Part Number	Qty	Description
1	A-RTT12-00410-A	1	BATTERY CABLE PLUG
2	A-RTT12-00410-C	1	JUMPER CABLE FOR CONTACTOR
3	A-RTT12-00420	1	FRAME CLAMP 2.5"
3A	A-RTT12-00421	1	ADJUSTING ARM 8.5"
4	A-RTT12-00333	4	SPACER
5	1/4 X 20 2 1/2 GRADE 5	4	BOLT

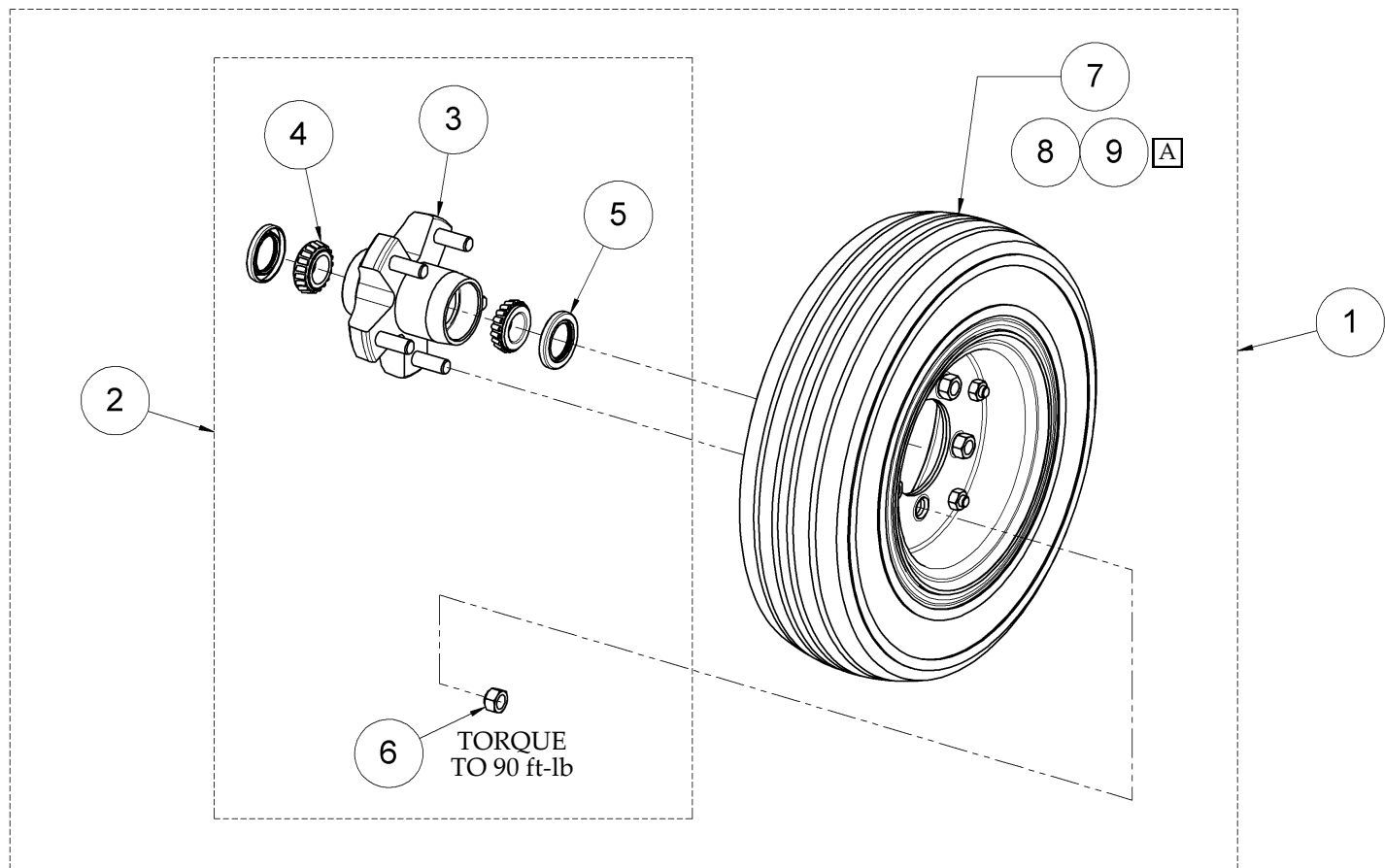
*Note: A-RTT12-00410 is for the entire set which includes motor drive lead cables from page 14

CASTER ASSEMBLY



Item	Part Number	Qty.	Description
1	A-RTT18B-00050	1	FRONT STEERABLE WHEEL FRAME
2	R5925-T	1	MYLAR CASTER SPACER
3	A-RTT18B-00050-C	1	AXLE BOLT KIT WITH SPACERS
4	A-RTT18B-00050-B	3	CASTER SPRING
5	A-RTT12-00105	1	FLANGE BEARING
6	NPN	4	FHCS, 1/2-13 UNC X 2
7	NPN	4	FLAT WASHER, 1/2
8	NPN	4	LOCK NUT, 1/2-13 UNC

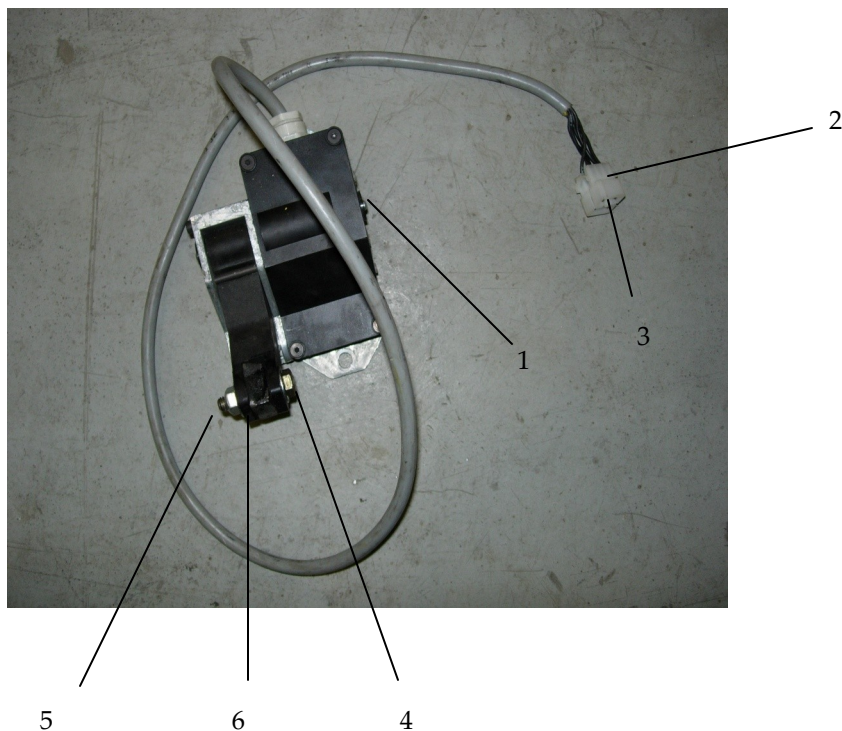
FRONT WHEEL AND TIRE



Item	Part Number	Qty.	Description
1	RT18-04-005-AA	1	RTT-18 FRONT WHEEL, TIRE, AND HUB ASSEMBLY
2	RT18-54-001-KA	1	RTT-18 HUB KIT (INCLUDES SEALS, BEARINGS, AND LUG NUTS)
3	RT18-04-001-CA	1	WHEEL HUB, 5-4.50 BC, STUDDED
4	A-RTT12E-00049D	2	WHEEL HUB BEARING CONE
5	A-RTT12E-00049G	2	WHEEL HUB SEAL
6	A-TT4-00123	5	LUG NUT, 1/2-20 UNF X 60 DEGREES
7	RT18-54-003-KA	1	WHEEL AND TIRE, ASSEMBLED
8	RT18-04-002-CA	1	3.75 X 8 SPLIT RIM, 5 X 4.50 BC (SEE NOTE A)
9	RT18-04-003-CA	1	400 X 8 - 3.75 SOLID TIRE (SEE NOTE A)

[A] When the tire or wheel are ordered separately it is the responsibility of the end customer to assemble the tire to the rim. Note that this assembly requires specialized equipment.

ACCELERATOR PEDAL ASSEMBLY



Item	Part Number	Qty	Description
1	A-RTT-00281-1	1	ACCELERATOR PEDAL ASSEMBLY (KIT)
2	A-RTT12-00422	1	ACC PLUG
3	A-RTT12-00424	4	ACC PLUG PINS
4	5/16-18X1.25 G8 HCS	1	BOLT
5	5/16-18	1	LOCKNUT
6	A-RTT12-00282	1	PLASTIC FOOT PEDAL WHEEL (INSERT)
7	A-RTT12-00281-1	1	ALUMINUM FOOT PEDAL
8	1/4-20 X 1 1/2 G5 HCS	4	BOLT
9	1/4-20 LOCK NUT	4	LOCKNUT
10	1/4 WASHERS	8	WASHERS

*Please note that when ordering part number A-RTT-00281-1 it includes part # A-RTT12-00422 & A-RTT12-00424

HORN ASSEMBLY



Item	Part Number	Qty	Description
1	A-RTT18B-00399	1	STEERING COLUMN TILT

STEERING BOX ASSEMBLY



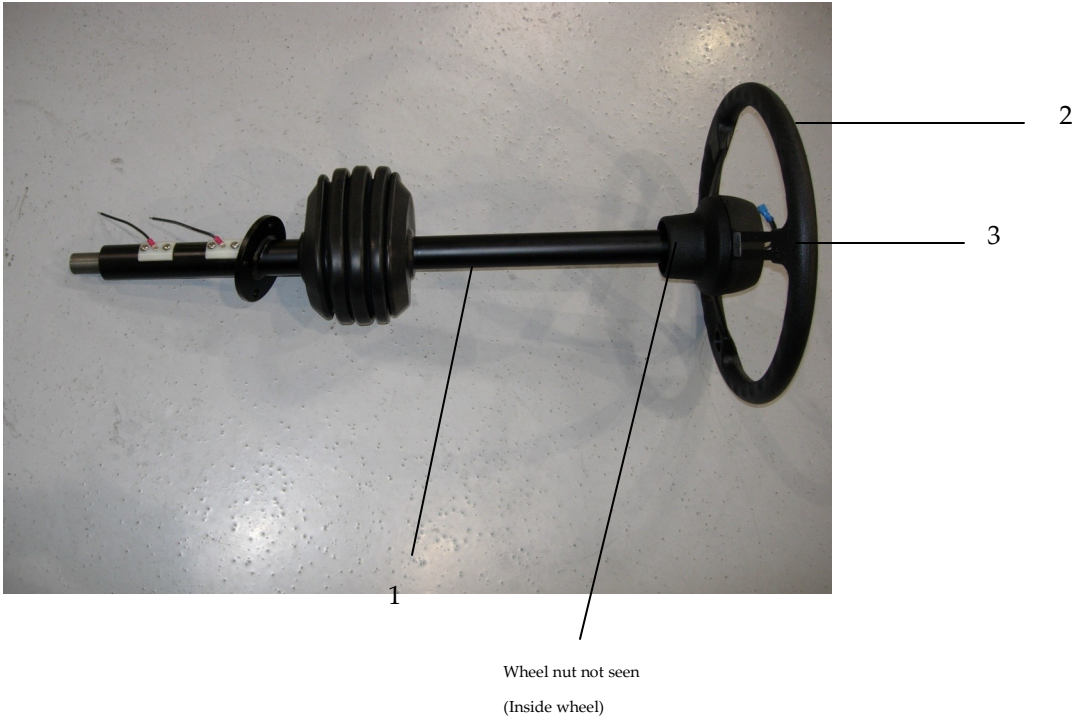
1 8 9 10 2 3 7



4 5 11

Item	Part Number	Qty	Description
1	A-RTT12-00381	1	STEERING BOX
2	A-RTT12-00383-MACH	1	STEERING BOX YOKE
3	A-RTT12-00387	1	CENTER YOKE
4	A-RTT12-00386-RETAIL	1	YOKE TUBE & ADAPTER
5	A-RTT12-00385	1	LOCKING COLLAR
7	A-RTT12-00384	3	U-JOINT
8	A-RTT12-00330	3	SPACER 1 3/8"
9	7/16-14X2.5 G8 HCS	3	BOLT
10	AE-OPT-0180-2	3	3/8 G8 FLAT WASHER
11	SHOP 3 1/2"	1	KEYWAY
12	A-RTT12-00390	1	SET SCREW
13	A-RTT12-00391	1	JAM NUT
14	3/8 X 1 X 3 1/4	1	KEY

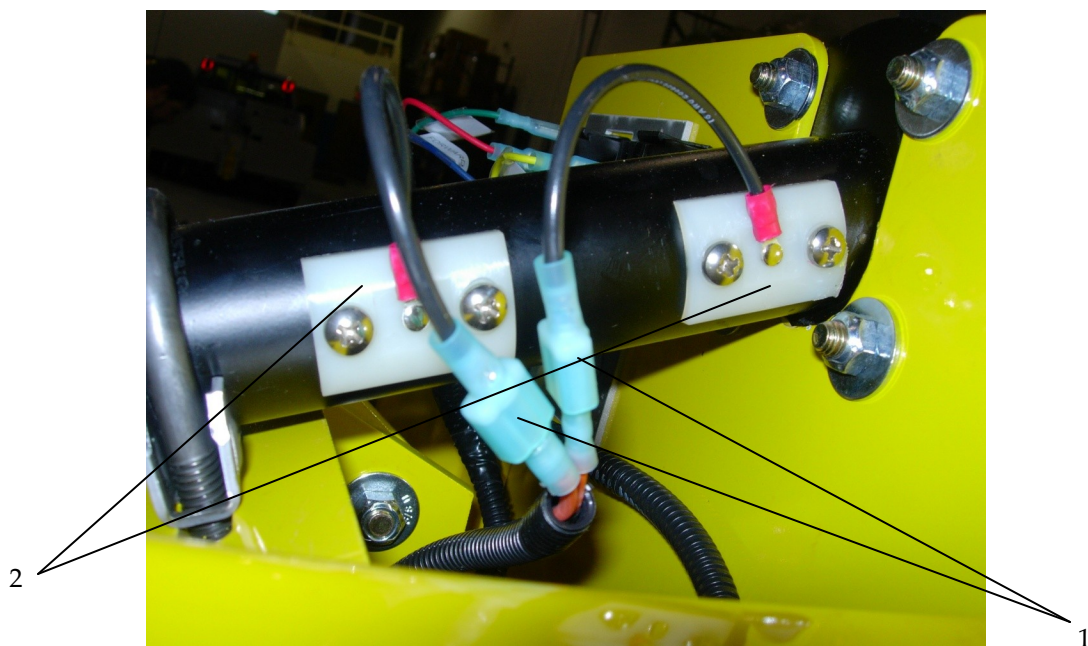
STEERING COLUMN



Item	Part Number	Qty	Description
1	A-RTT18B-00399	1	STEERING COLUMN TILT
2	A-RTT18B-00809	1	STEERING WHEEL
3	A-TT10-00811	1	HORN BUTTON
4	A-TT10-00813	1	STEERING WHEEL NUT
5	A-RTT12-00052	1	HORN

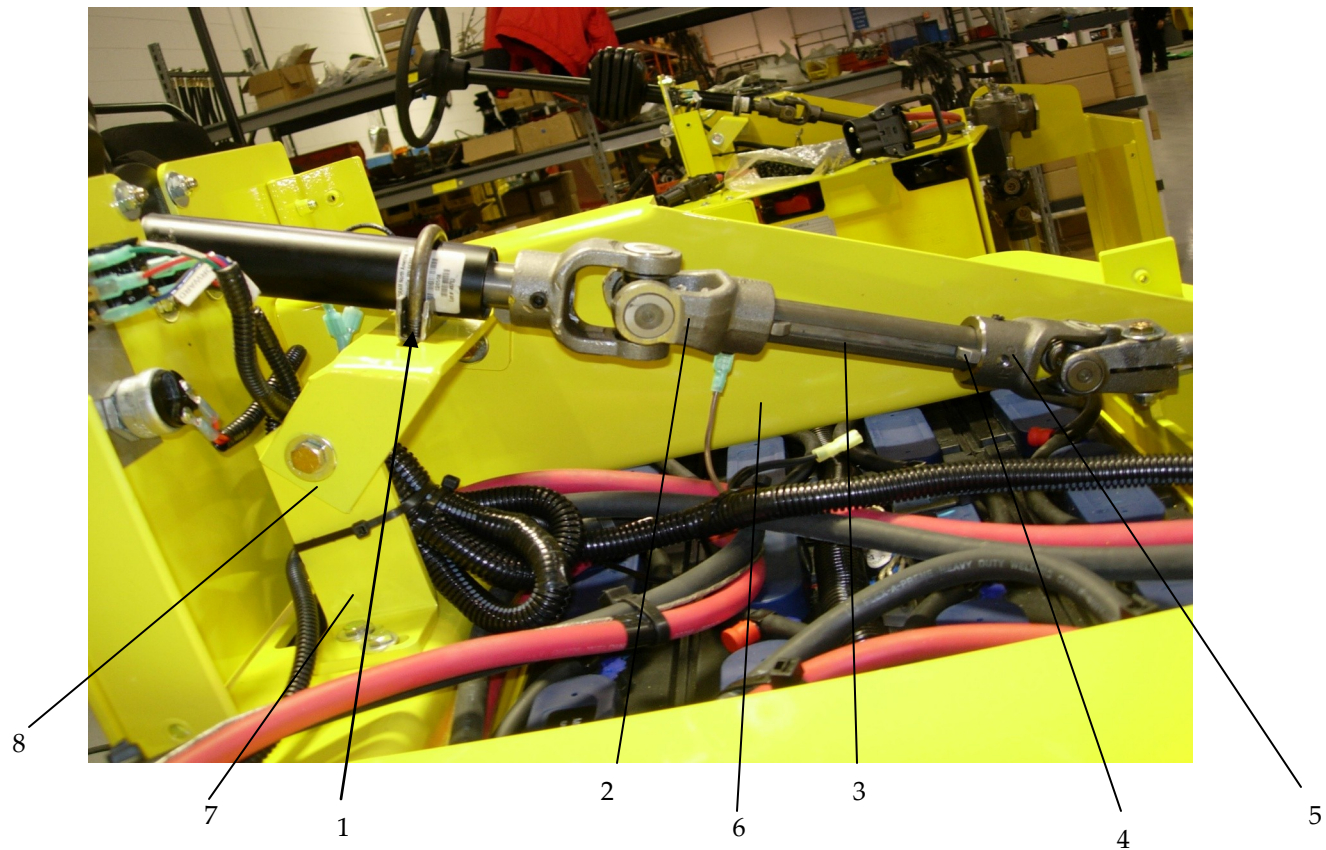
*If horn brush assembly (A-RTT12-00399-A) is serviced at any time it is best to thoroughly clean the contact ring (through the horn brush hole-a cotton swab may be helpful) to remove any wear debris and grease residue. Add new grease before installing a new horn brush assembly.

STEERING COLUMN ASSEMBLY



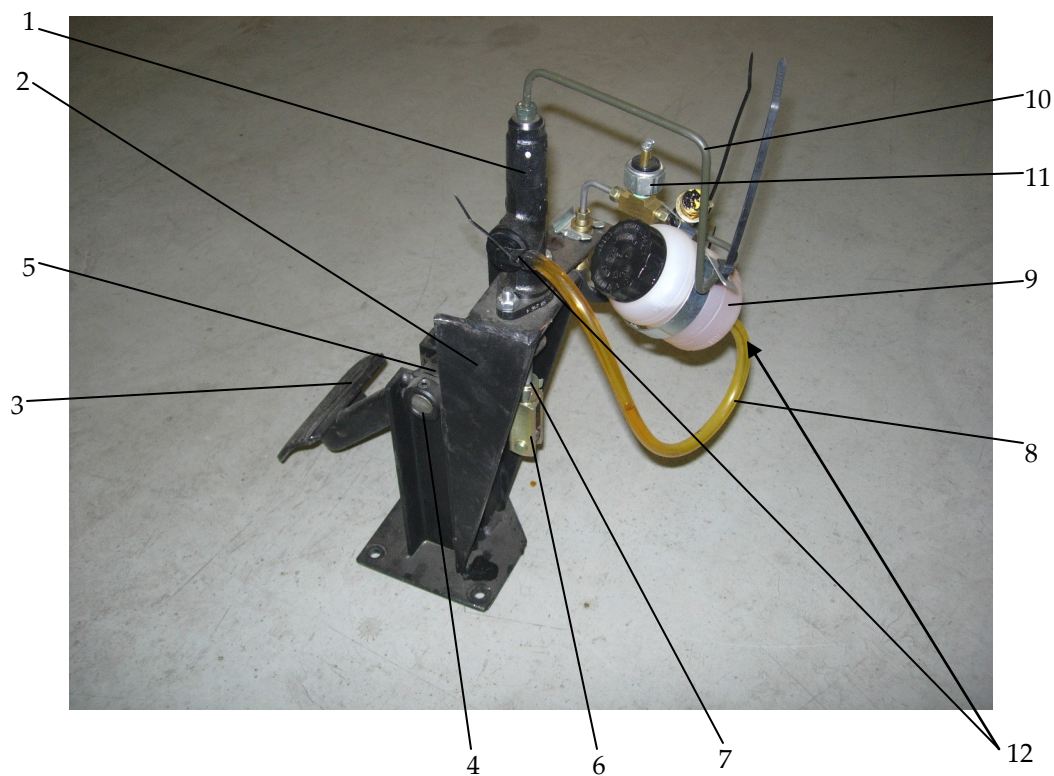
Item	Part Number	Qty	Description
1	1614DM250NFI	2	ELECTRIC MALE END FITTING
2	A-RTT12-00399-A	2	WHITE HORN BRUSH ASSEMBLY

STEERING COLUMN SUPPORT



Item	Part Number	Qty	Description
1	A-TT4-00328	1	1 1/2IN CLAMP 3/8IN HD
2	A-TT4-00391	1	UNIVERSAL JOINT
3	A-TT4-00392	1	1" ROUND SHAFT W 1/4IN KEY X 7"
4	A-TT4-00393	3	GIBB KEY
5	A-TT4-00389	1	UNIVERSAL COUPLER
6	A-RTT12E-00308	1	STEERING COLUMN SUPPORT RTT18E
7	A-RTT18B-00397	1	STEERING SUPPORT BRKT RTT18E
8	A-RTT18B-00398	1	STEERING COLUMN SUPPT BRKT RTT18E

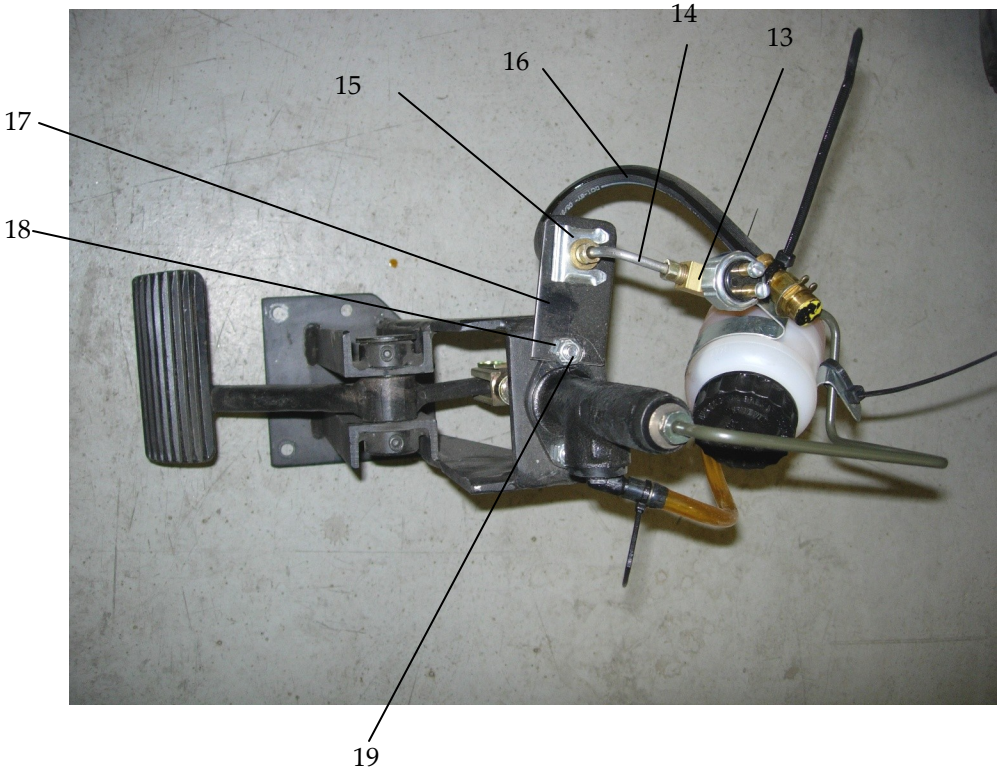
MASTER CYLINDER ASSEMBLY (PRIOR TO JULY 2012)



Item	Part Number	Qty	Description
1	A-RTT12-00161	1	MASTER CYLINDER
2	A-RTT12-00163	1	MASTER CYLINDER BRACKET
3	A-RTT12-00181	1	BRAKE PEDAL
4	C-TT4-10182	1	PEDAL PIVOT PIN
5	C-TT4-10188	1	NYLINER BEARINGS
6	A-RTT12-00389	1	CLEVIS
7	7/16-14	1	JAM NUT
8	A-RTT12-00164 X 15	1	TUBING
9	A-RTT12-00162	1	RESERVOIR
10	A-RTT12-00170	1	BRAKE LINE CENTER
11	A-TT4-00173	1	SWITCH
12	A-RTT12-00165	2	FI HOSE CLAMPS 1/4

Note: Item # 12-18 Continued on (2 of 2)

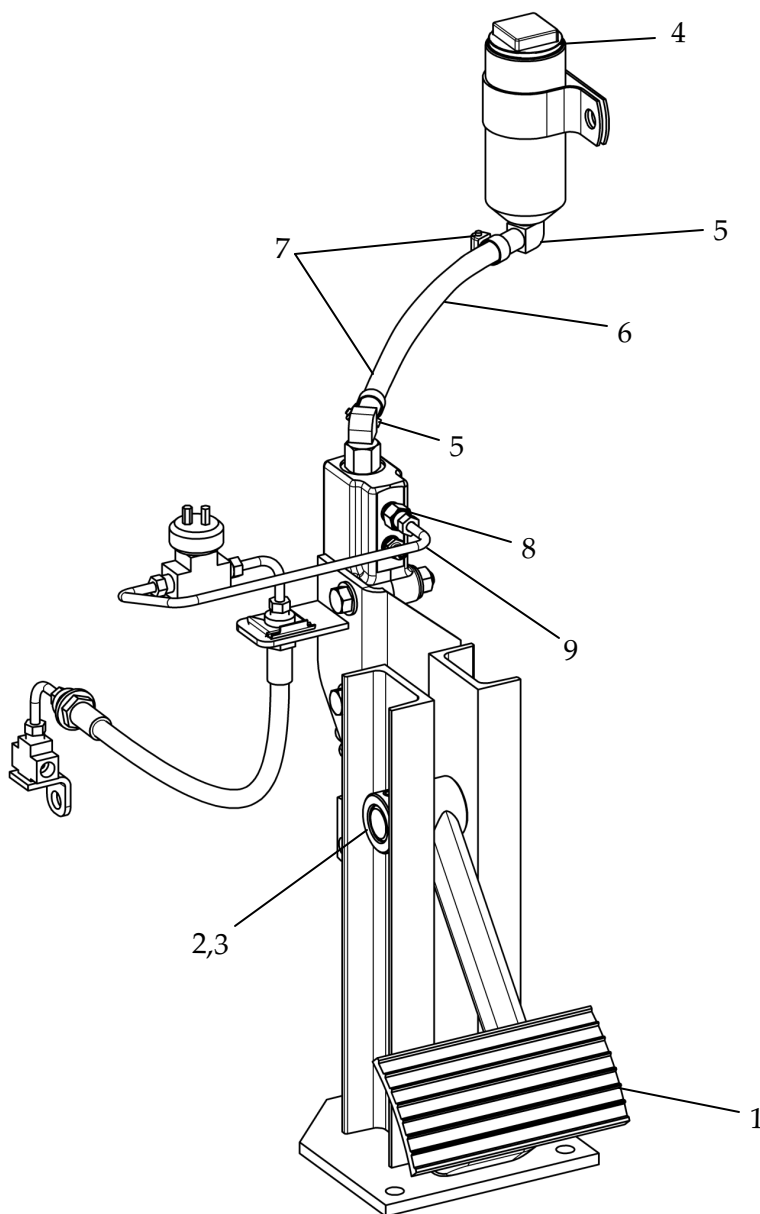
MASTER CYLINDER ASSEMBLY (PRIOR TO JULY 2012)



Item	Part Number	Qty	Description
13	A-TT4-00163	1	SWITCH TEE
14	A-TT4-00167	1	90 DEGREE BRAKE LINE
15	A-TT4-00165	1	BRAKE HOSE CLIP
16	A-TT4-00166	1	BRAKE HOSE
17	NPN	1	HOSE BRACKET (EAGLE FAB PART)
18	5/16-18	2	LOCK NUT
19	5/16-18X1 G5 HCS	1	BOLT

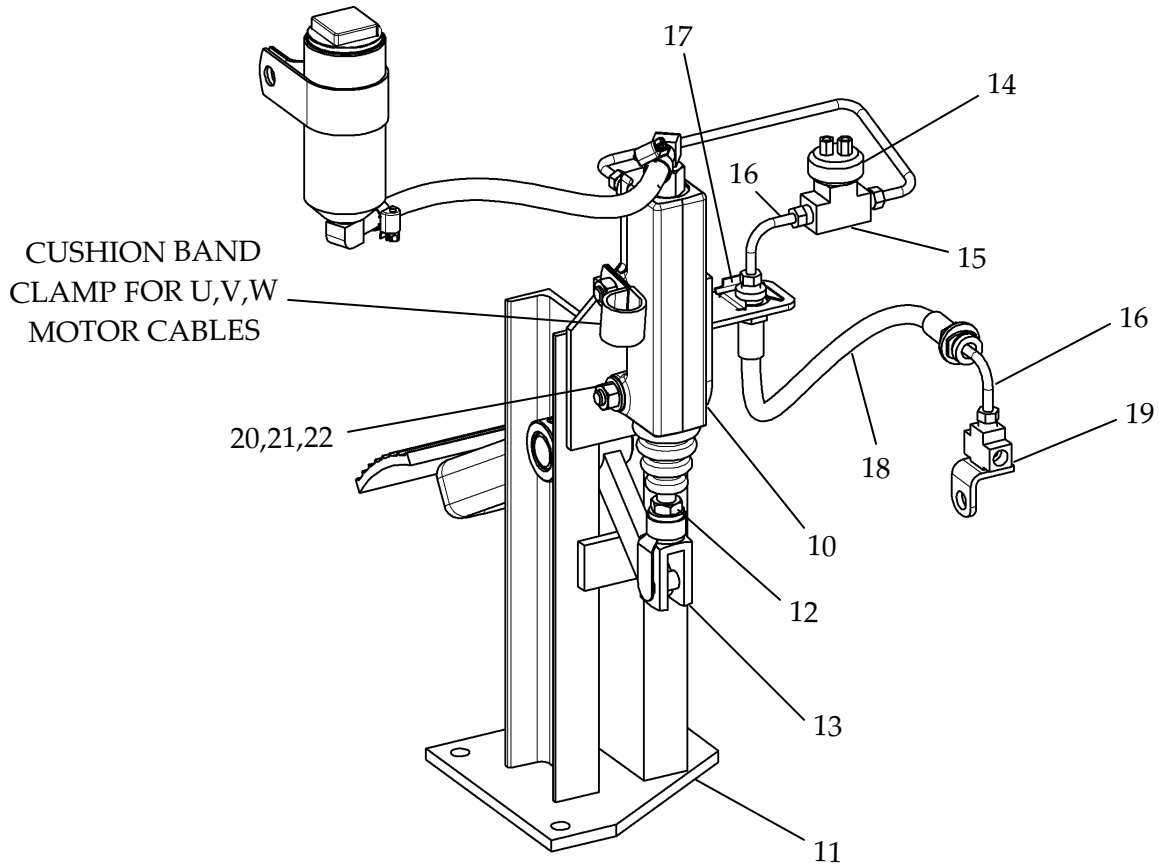
Note: Use 5/16-18X1.5 on Master Cylinder for clamp space on assembly (RH side)

MICO MASTER CYLINDER ASSEMBLY (AFTER JULY 2012)



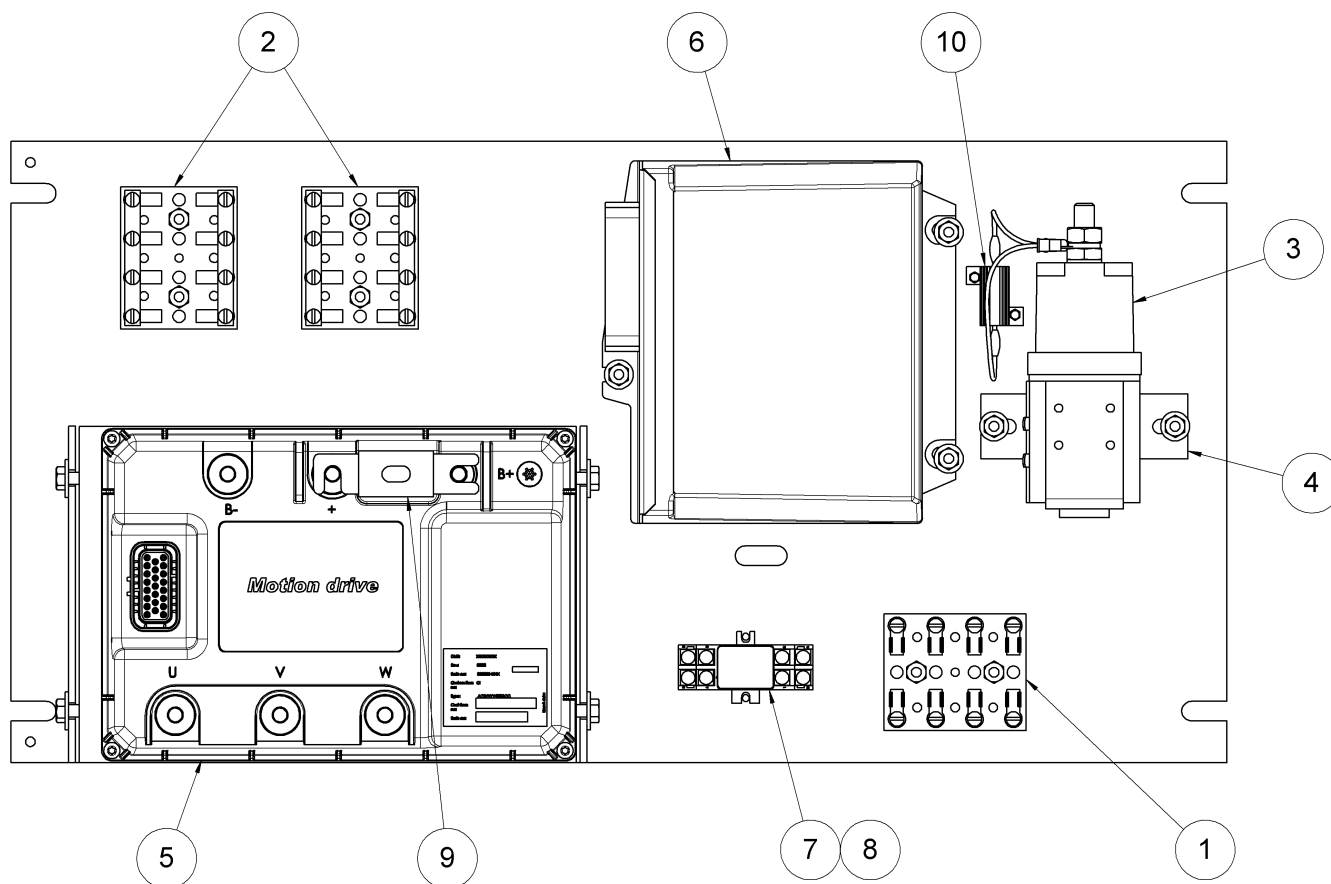
Item	Part Number	Qty	Description
1	A-RTT12-00181	1	BRAKE PEDAL
2	C-TT4-10182	1	PEDAL PIVOT PIN
3	C-TT4-10188	1	NYLINER BEARING
4	RT00-13-002-CA	1	BRAKE RESERVOIR
5	129HB-5-2	2	ADAPTER, 1/8 NPTF-5/16 HOSE
6	A-RTT12-00164	1	TUBING 15 INCHES
7	A-RTT12-00165	2	FI HOSE CLAMP 1/4"
8	48IFHD-3-2	1	ADAPTER, 1/8 NPT F - 3/16 INV FLARE
9	RT00-13-004-SA	1	BRAKE LINE CENTER

MICO MASTER CYLINDER ASSEMBLY (AFTER JULY 2012)



Item	Part Number	Qty	Description
10	RT00-13-001-CA	1	MASTER CYLINDER
11	RTT00-13-003-SA	1	MASTER CYLINDER BRACKET
12	NPN	1	3/8-24 HEX JAM NUT
13	NVSP-24-008-CA	1	CLEVIS
14	A-TT4-00173	1	BRAKE SWITCH
15	A-TT4-00163	1	SWITCH TEE
16	A-TT4-00167	2	90 DEGREE BRAKE LINE
17	A-TT4-00165	1	BRAKE HOSE CLIP
18	A-TT4-00166	1	BRAKE HOSE
19	A-TT4-00168	1	BRAKE LINE TEE
20	NPN	2	5/16-18 X 2 HCS
21	NPN	4	5/16 FLAT WASHER
22	NPN	2	5/16-18 LOCK NUT

ELECTRICAL COMPONENT ASSEMBLY



Item	Part Number	Qty	Description
1	A-TT4-00299	1	FUSE BLOCK
2	A-TT4-00300	2	BUS BAR
3	A-RTT-00282	1	DRIVE CONTACTOR
4	A-RTT-00283	1	CONTACTOR BRACKET
5	A-RTT-00370*	1	TRACTION DRIVE
6	A-RTT-00411*	1	VEHICLE MASTER CONTROLLER
7	A-RTT12-00408	1	LIGHT RELAY SOCKET
8	A-RTT12-00409	1	LIGHT RELAY
9	A-RTT12-00417	1	DRIVE FUSE, 400A
10	RT00-82-001-KA**	1	PRE-CHARGE RESISTOR
11	A-TT3-0010	3	AGC 25 AMP FUSE

*Vehicle serial number and hours must be provided when ordering these components.

**Prior to 2014 production the Pre-Charge Resistor part number was A-RTT12-00429.

ELECTRICAL COMPONENT ASSEMBLY



1

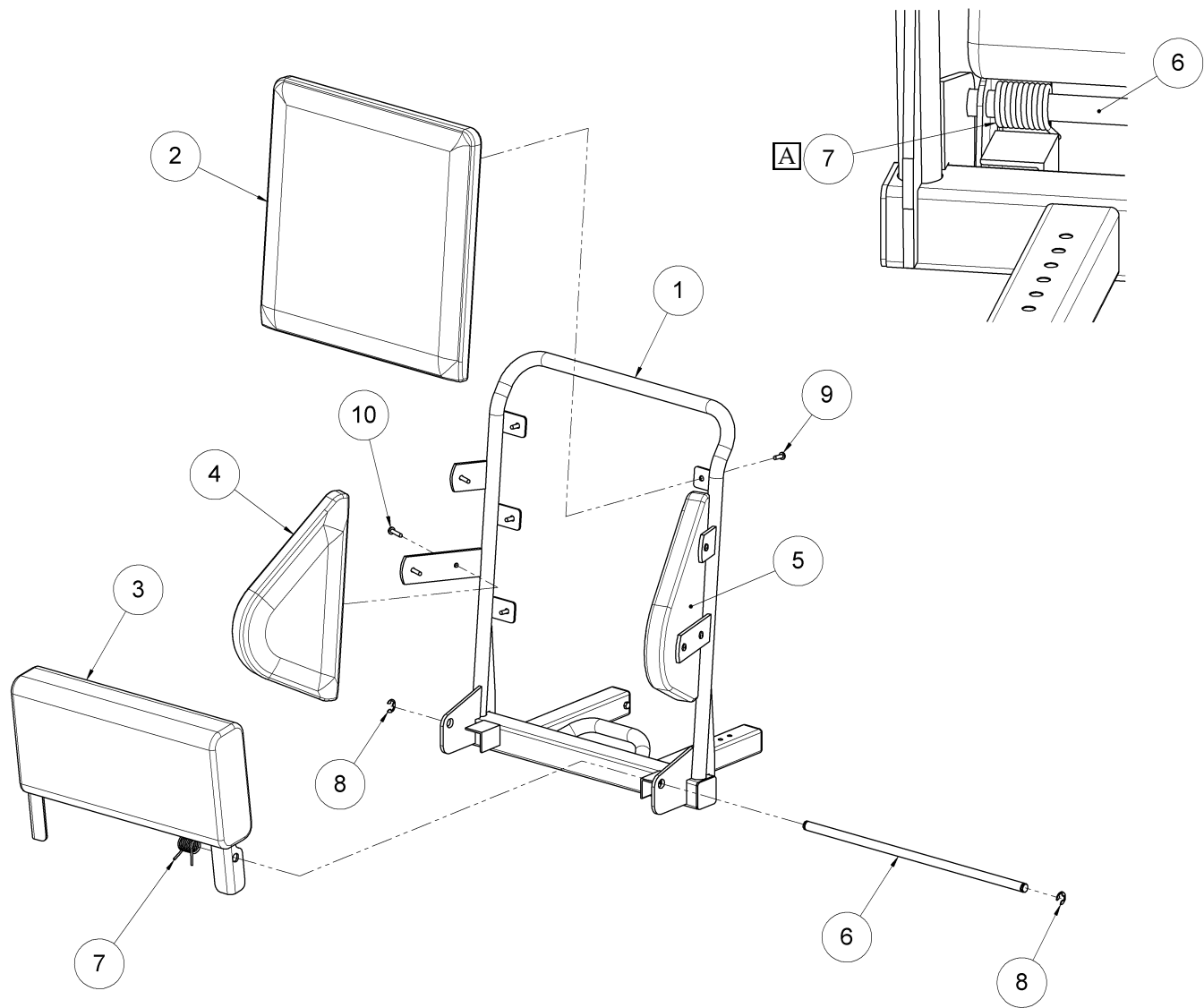
Item	Part Number	Qty	Description
1	A-RTT-00414	1	DC-DC CONVERTER 20 AMP

INSTRUMENT PANEL ASSEMBLY



Item	Part Number	Qty	Description
1	A-RTT12-00418-1	1	F/N/R ROCKER SWITCH
2	A-RTT12-00428	1	LO/Hi SPEED SWITCH
3	A-RTT12-00416-1	1	KEY SWITCH
4	A-RTT-00415	1	OPT 10 DISPLAY (STANDARD)

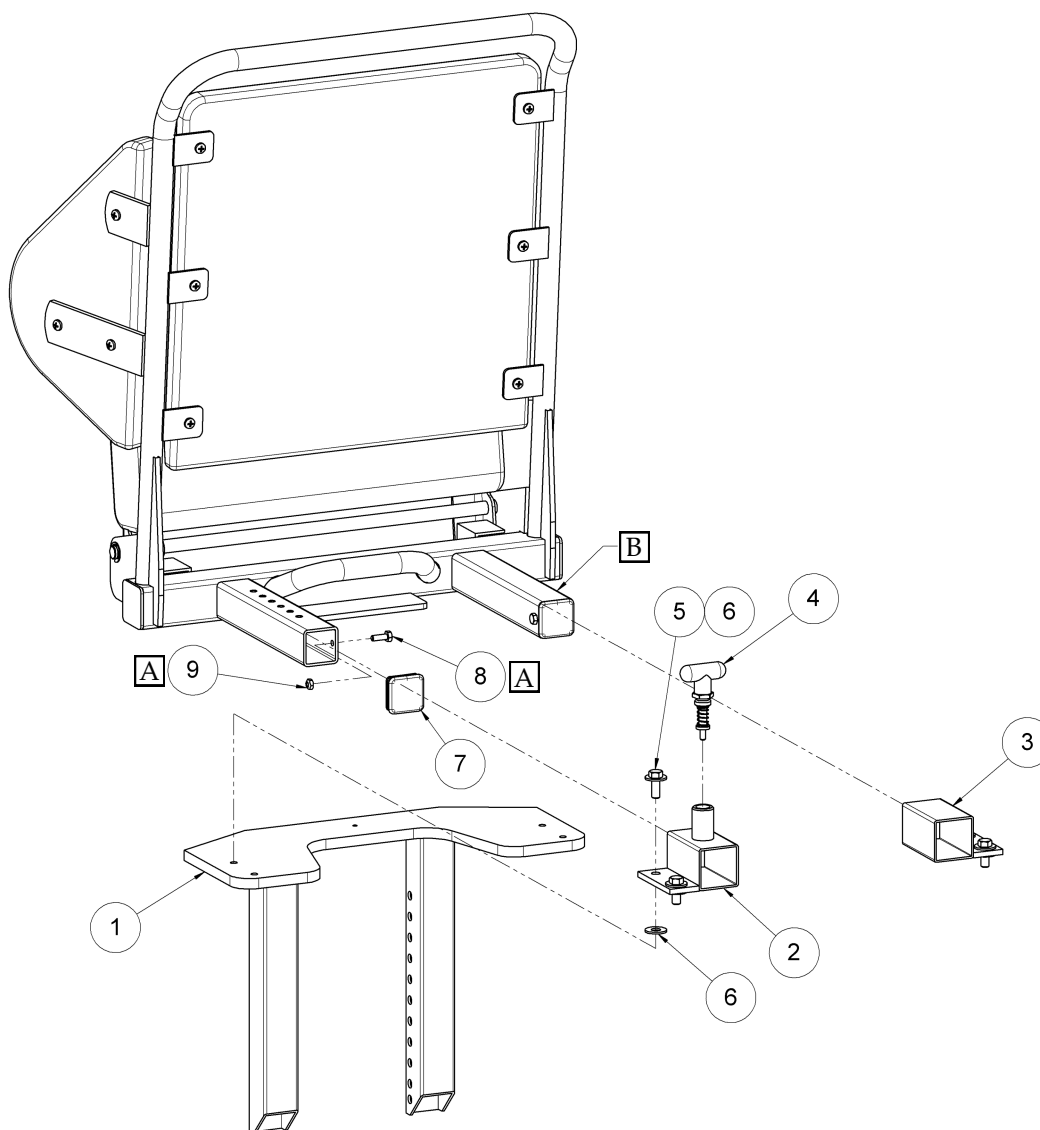
SEAT CUSHIONS



A Item 7 installed view shown from rear of seat.

Item	Part Number	Qty.	Description
1	A-RTT12-0048-L	1	UPPER SEAT FRAME
2	A-RTT12-0047-A	1	BACK SEAT CUSHION
3	A-RTT12-0047-B	1	BOTTOM SEAT CUSHION
4	A-RTT12-0047-C	1	SEAT CUSHION, RH WING
5	A-RTT12-0047-D	1	SEAT CUSHION, LH WING
6	A-RTT12-0048-M	1	SEAT PIVOT SHAFT
7	A-RTT12-0048-B	1	TORSION SPRING
8	A-RTT12-00483	2	EXTERNAL RETAINING RING
9	A-RTT12-00481	6	PHS, 1/4-20 X .75
10	A-RTT12-00486	6	PHS, 1/4-20 X 1.25
N/A	A-RTT12-0047	N/A	SEAT CUSHION SET (4 PIECES, INCLUDES SEAT BOTTOM)

SEAT MOUNT TO FRAME

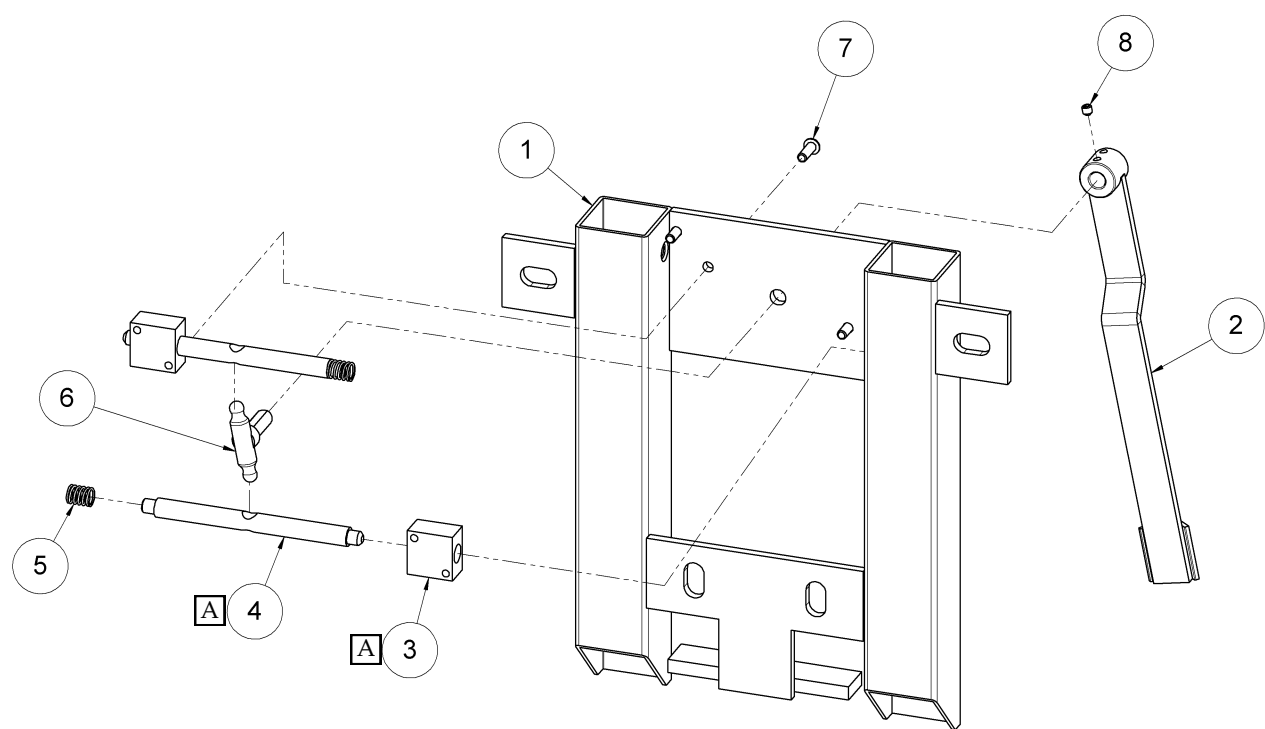


A Items 8 and 9 must be installed after the seat guides are installed.

B Use Loctite® Krytox® RFE lubricant or equivalent.

Item	Part Number	Qty.	Description
1	A-RTT12-0048-K	1	MID-SECTION SLIDE
2	A-RTT12-0048-H	1	LH SEAT GUIDE W/BOSS
3	A-RTT12-0048-J	1	RH SEAT GUIDE
4	A-RTT12-0048-A	1	T-HANDLE
5	NPN	4	HCS, 3/8-16 UNC X 1
6	NPN	8	FLAT WASHER, 3/8
7	A-RTT12-00482	2	SQUARE TUBE PLUG
8	NPN	2	HCS, 1/4-20 UNC X .75
9	NPN	2	LOCK NUT, 1/4-20 UNC

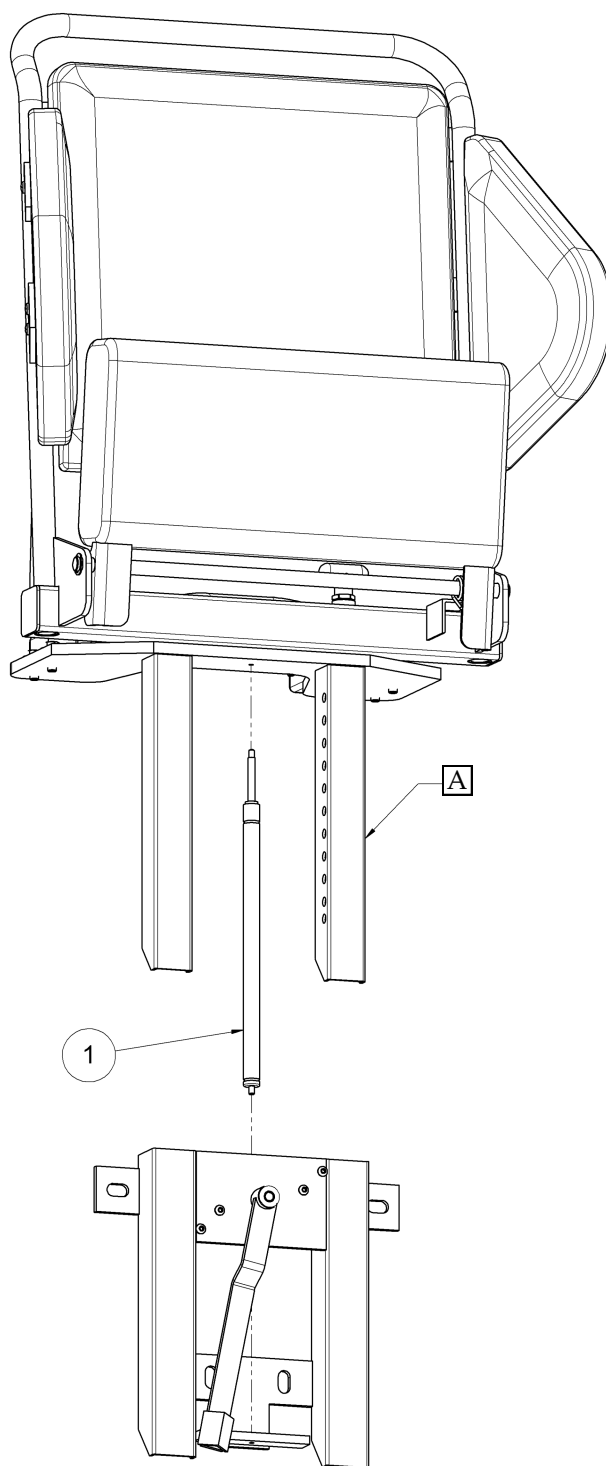
BELL CRANK AND RELEASE LEVER



A Use Permatex® Anti-Seize Lubricant or equivalent at interface between items 4 and 3.

Item	Part Number	Qty.	Description
1	A-RTT12-0048-G	1	SEAT MOUNTING FRAME
2	A-RTT12-0048-F	1	RELEASE LEVER
3	A-RTT12-0048-E	2	GUIDE BLOCK
4	A-RTT12-0048-D	2	DETENT SHAFT
5	A-RTT12-0048-D2	2	DETENT SHAFT SPRING
6	A-RTT12-0048-C	1	BELL CRANK
7	NPN	4	BHCS, 1/4-20 UNC X .75
8	NPN	2	SET SCREW, 1/4-20

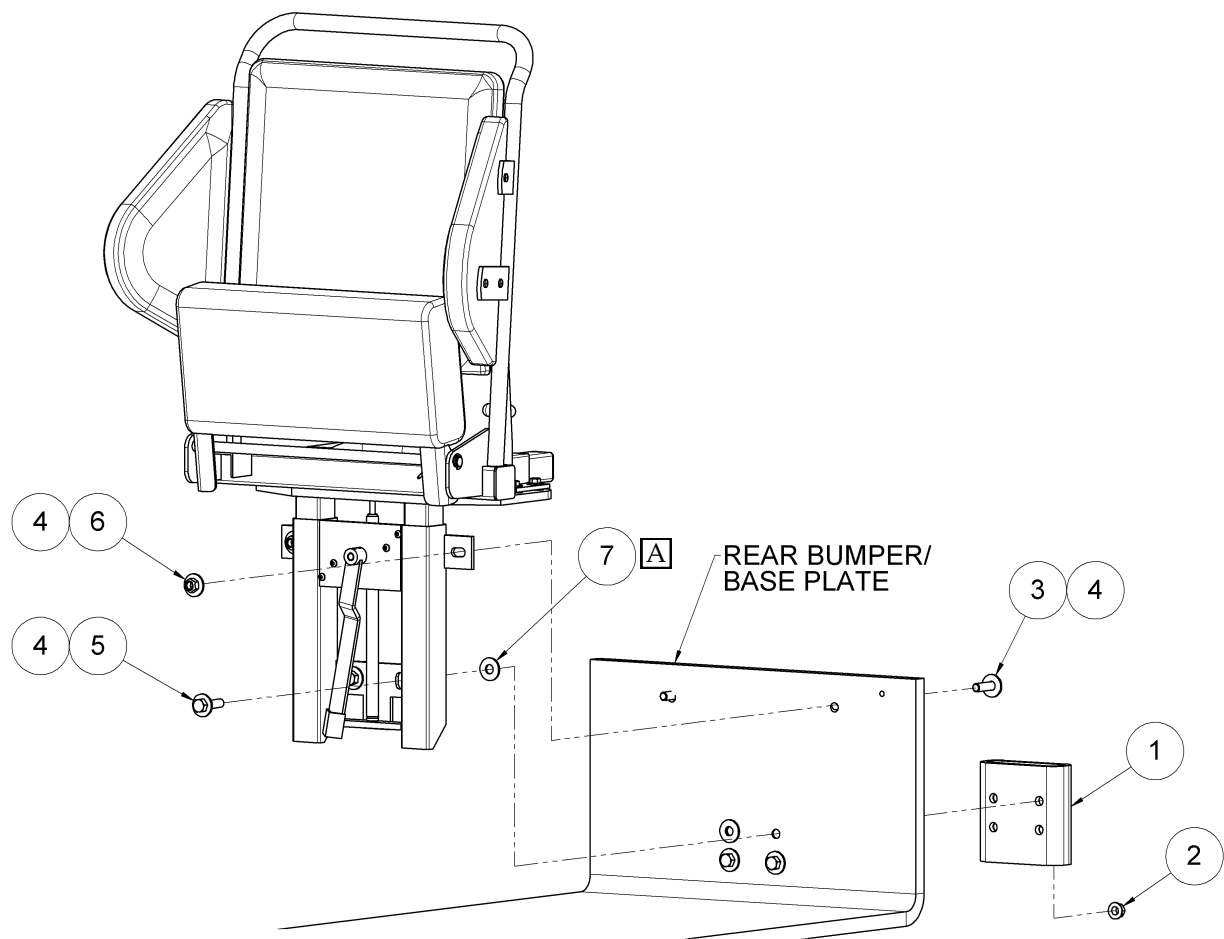
SEAT ASSEMBLY TO SEAT FRAME



A Use Loctite® Krytox® RFE lubricant or equivalent.

Item	Part Number	Qty.	Description
1	A-RTT12-00480	1	SEAT ADJUSTMENT SPRING

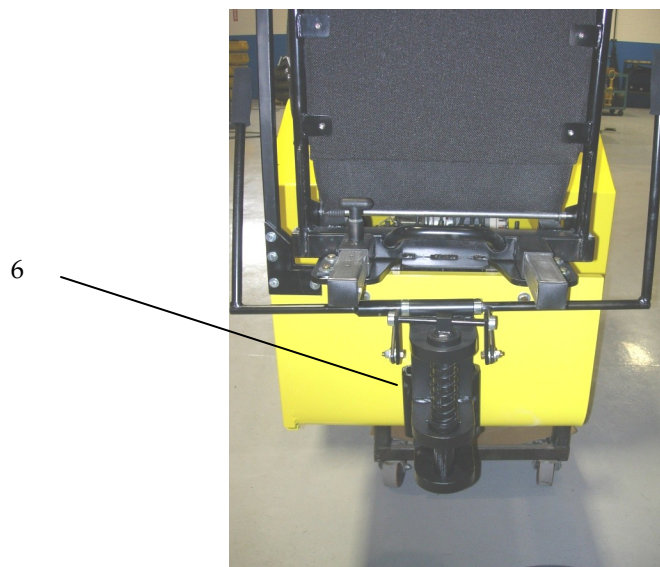
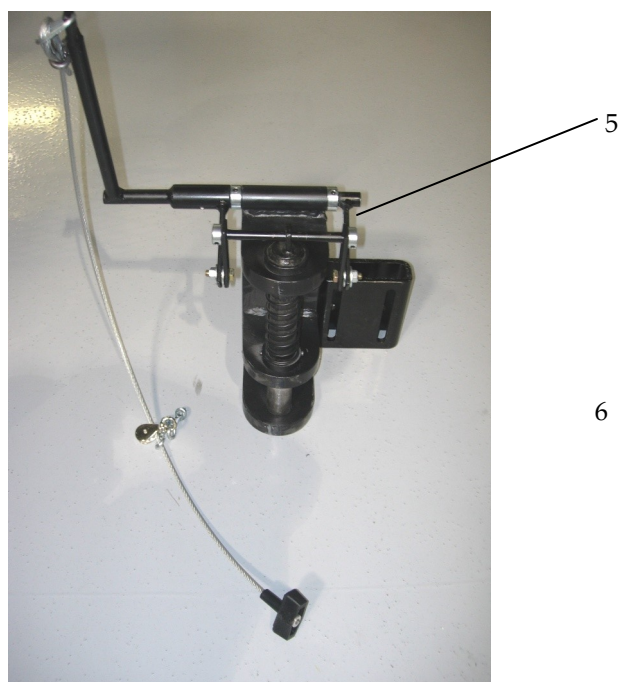
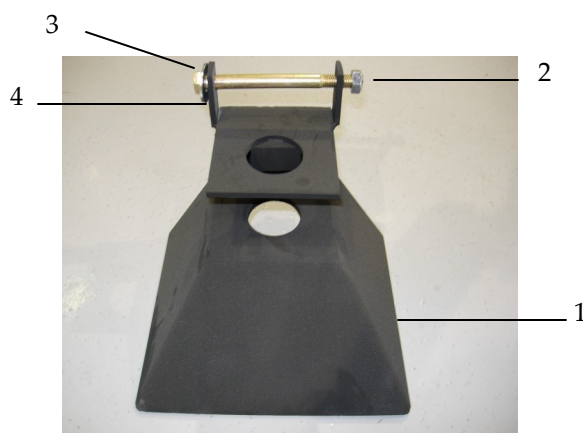
SEAT INSTALLATION TO REAR BUMPER



A Item 7 can be added to correct slide function if required.

Item	Part Number	Qty.	Description
1	AE-OPT-0036-18A	1	REAR HITCH ADAPTER
2	NPN	4	LOCK NUT, SERRATED FLANGE, 1/2-13 UNC
3	NPN	4	HCS, 1/2-13 UNC X 1.75
4	NPN	8	FLAT WASHER, 1/2
5	NPN	2	HCS, 1/2-13 UNC X 2
6	NPN	2	LOCK NUT, 1/2-13 UNC
7	NPN	2	FLAT WASHER, 1/2

TOW BAR RAMP, FRONT AND REAR E HITCH ASSEMBLIES



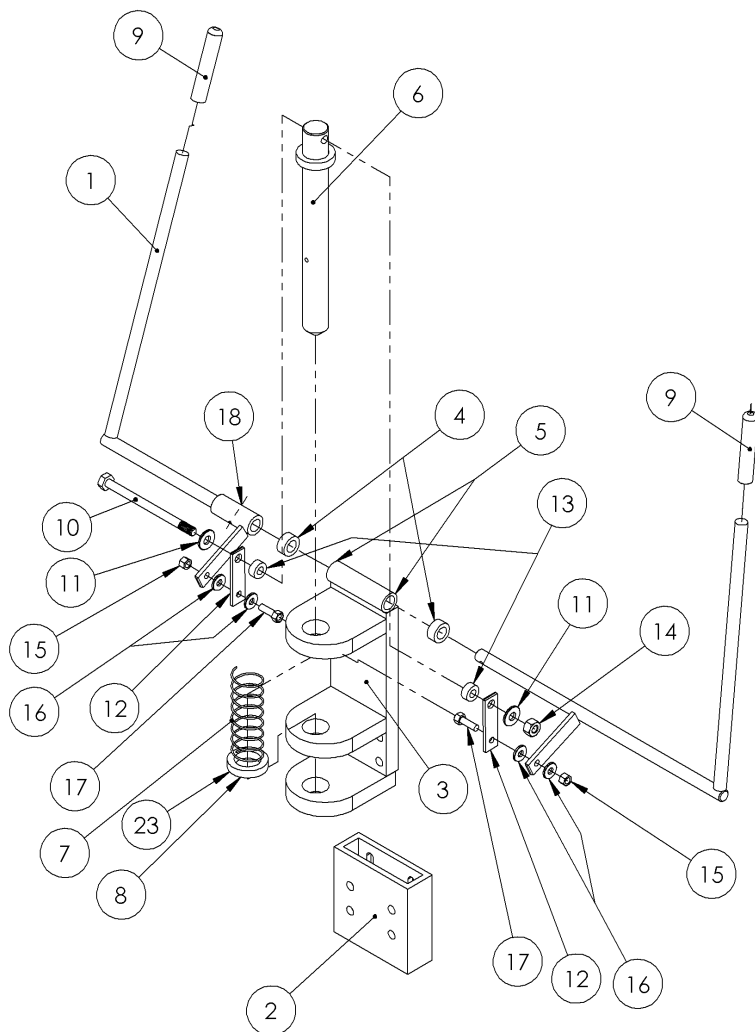
Item	Part Number	Qty	Description
1	AE-OPT-0036-21	1	TOWBAR RAMP COMPLETE ASSEMBLY
2	AE-OPT-0036-21A	1	1/2-13 X 6 GR 8 HCS BOLT
3	AE-OPT-0036C	1	1/2 FLAT WASHER
4	AE-OPT-0036D	1	1/2-13 LOCK NUT
5	OPT-RT18-002-A	1	FRONT E-HITCH W/REMOTE HANDLE COMPELTE ASSY
6	AE-OPT-0036-18D	1	REAR E-HITCH W/REMOTE HANDLE COMPLETE ASSY

REAR E-HITCH ASSEMBLY WITH LEVER

ITEM	PART NO.	DESCRIPTION	QTY
1	AE-OPT-0036-18D	REAR LEVER RELEASE	1
2	AE-OPT-0036-18A	HITCH HEIGHT ADAPTER	1
3	AE-OPT-0036	HITCH BODY	1
4	A-TT2-0057	SHAFT COLLAR 3/4"	2
5	C-TT4-10188	NYLINER BEARING	2
6	AE-OPT-0036J	HITCH PIN	1
7	B-TT3-0008A	SPRING	1
8	B-TT3-0008 DET5	COLLAR	1
9	AE-OPT-0036A	FOAM GRIP	2
10	AE-OPT-0036-1B	BOLT 1/2-13x7 HCS GR8	1
11	AE-OPT-0036C	1/2 FLAT WASHER	2
12	AE-OPT-0036-20N	LEVER RELEASE SIDE TAB	2
13	A-TT2-0055	SHAFT COLLAR 1/2"	2
14	AE-OPT-0036D	1/2-13 LOCK NUT	2
15	AE-OPT-0036H	3/8-16 LOCK NUT	2
16	AE-OPT-00180-2	3/8 FLAT WASHER	4
17	AE-OPT-0036B	BOLT 3/8-16x1 1/4 HCS GR8	2
18	AE-OPT-0036-20Q	ROLL PIN	1
19	AE-OPT-0036-20K	1/2-13x1 3/4 HCS BOLT GR8	2
20	AE-OPT-0036-20L	1/2-13x2 HCS GR8 BOLT	6
21	AE-OPT-0036-20A	1/2-13 FLANGE NUT	8
22	AE-OPT-0036-1B	1/2 FLAT WASHER	4
23	B-TT3-0008B	COLLAR ROLL PIN	1

NOTES:

1. ITEMS 19-22 ARE NOT SHOWN AND USED TO MOUNT ITEM 2.

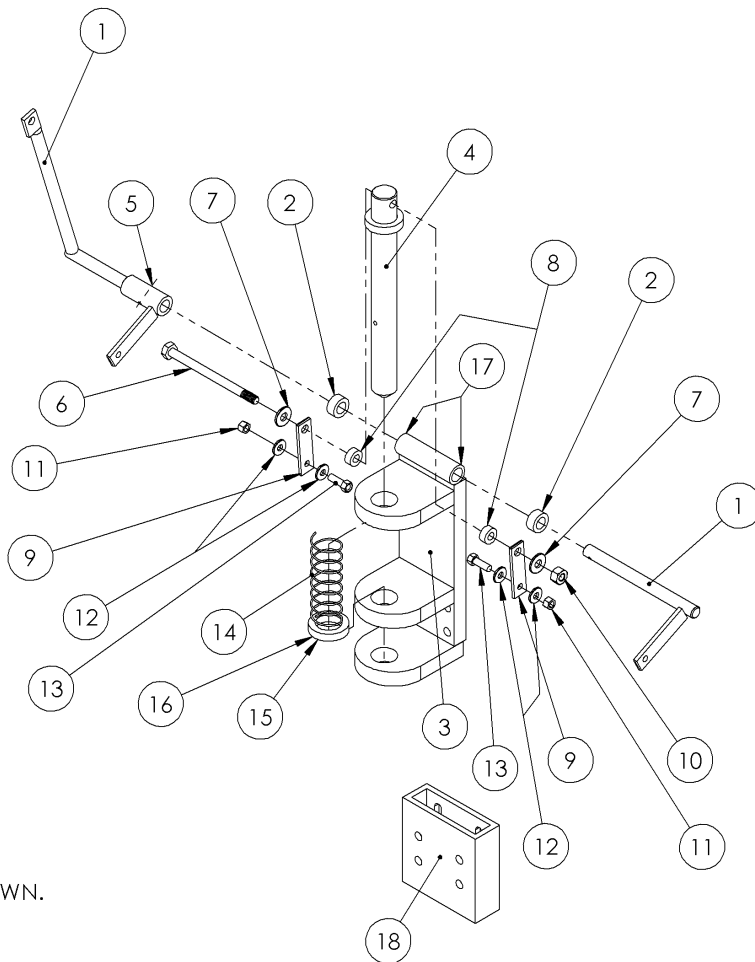


FRONT HITCH ASSEMBLY

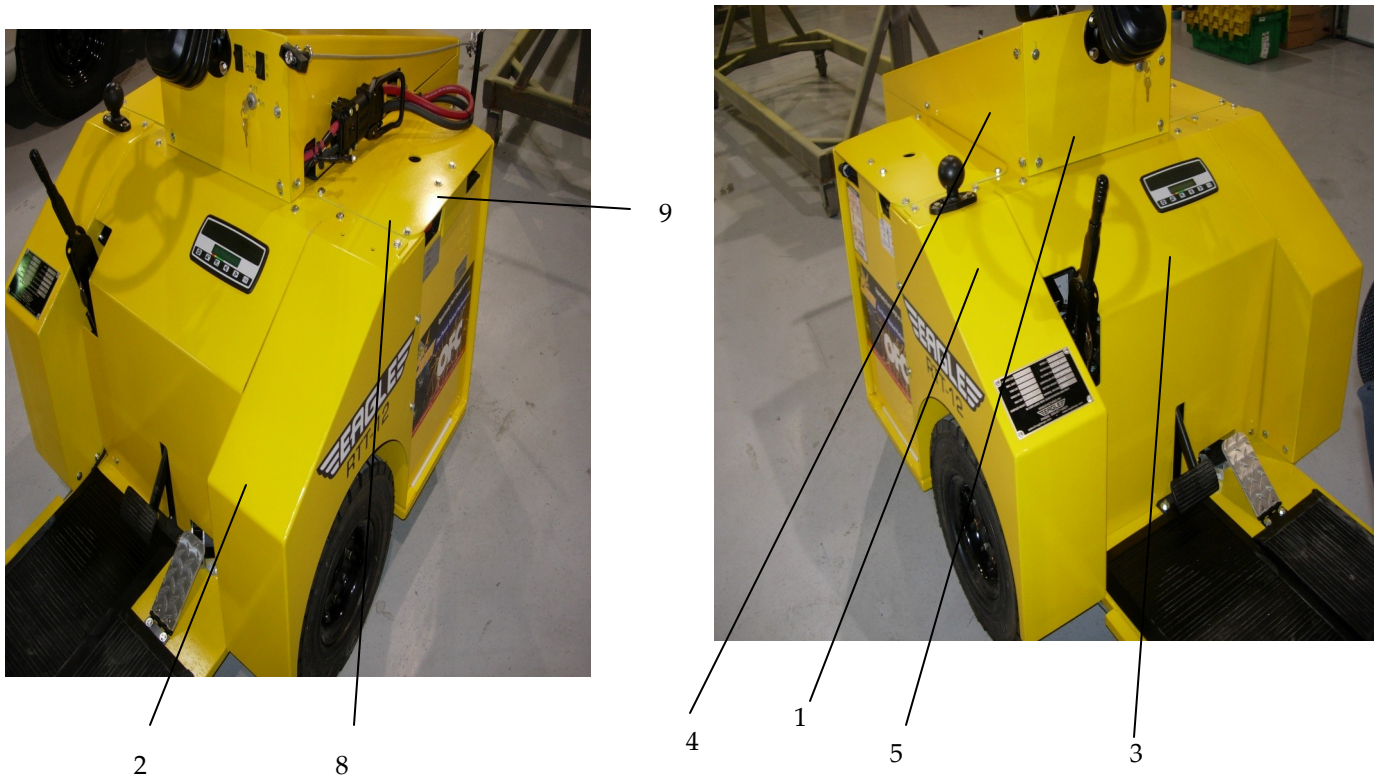
ITEM	PART NO.	DESCRIPTION	QTY
1	RT18-14-001-SA	LEVER ARM	1
2	A-TT2-0057	SHAFT COLLAR 3/4"	2
3	AE-OPT-0036	HITCH BODY	1
4	AE-OPT-0036J	HITCH PIN	1
5	AE-OPT-0036-20Q	ROLL PIN	1
6	AE-OPT-0036-1B	BOLT 1/2-13x7 HCS GR8	1
7	AE-OPT-0036C	1/2 FLAT WASHER	2
8	A-TT2-0055	SHAFT COLLAR 1/2"	2
9	AE-OPT-0036-20N	LEVER RELEASE SIDE TAB	2
10	AE-OPT-0036D	1/2-13 LOCK NUT	2
11	AE-OPT-0036H	3/8-16 LOCK NUT	2
12	AE-OPT-00180-2	3/8 FLAT WASHER	4
13	AE-OPT-0036B	3/8-16x1 1/4 HCS GR8	2
14	B-TT3-0008A	SPRING	1
15	B-TT3-0008 DET5	COLLAR	1
16	B-TT3-0008B	COLLAR ROLL PIN	1
17	C-TT4-10188	NYLINER BEARING	2
18	AE-OPT-0036-18A	HITCH HEIGHT ADAPTER	1
19	AE-OPT-0036-20K	1/2-13x1 3/4 HCS BOLT GR8	4
20	AE-OPT-0036-20L	1/2-13x2 HCS GR8 BOLT	4
21	AE-OPT-0036-20A	1/2-13 FLANGE NUT	8
22	AE-OPT-0036-1B	1/2 FLAT WASHER	4
23	AE-OPT-0036-20I	COATED WIRE ROPE	4 FT
24	AE-OPT-0036-20D	WIRE ROPE CLIP	1
25	AE-OPT-0036-20E	WIRE ROPE THIMBLE	1
26	AE-OPT-0036-20F	THREADED CONNECTOR	2
27	AE-OPT-0036-20H	EYEBOLT W/ NUT	1
28	AE-OPT-0036-20B	PULL CORD STARTER HANDLE	1
29	AE-OPT-0036-20C	ALUMINUM STOP SLEEVE	1

NOTES:

1. ITEMS 19-22 USED TO MOUNT ITEM 18 & NOT SHOWN.
2. ITEMS 23-29 NOT SHOWN.

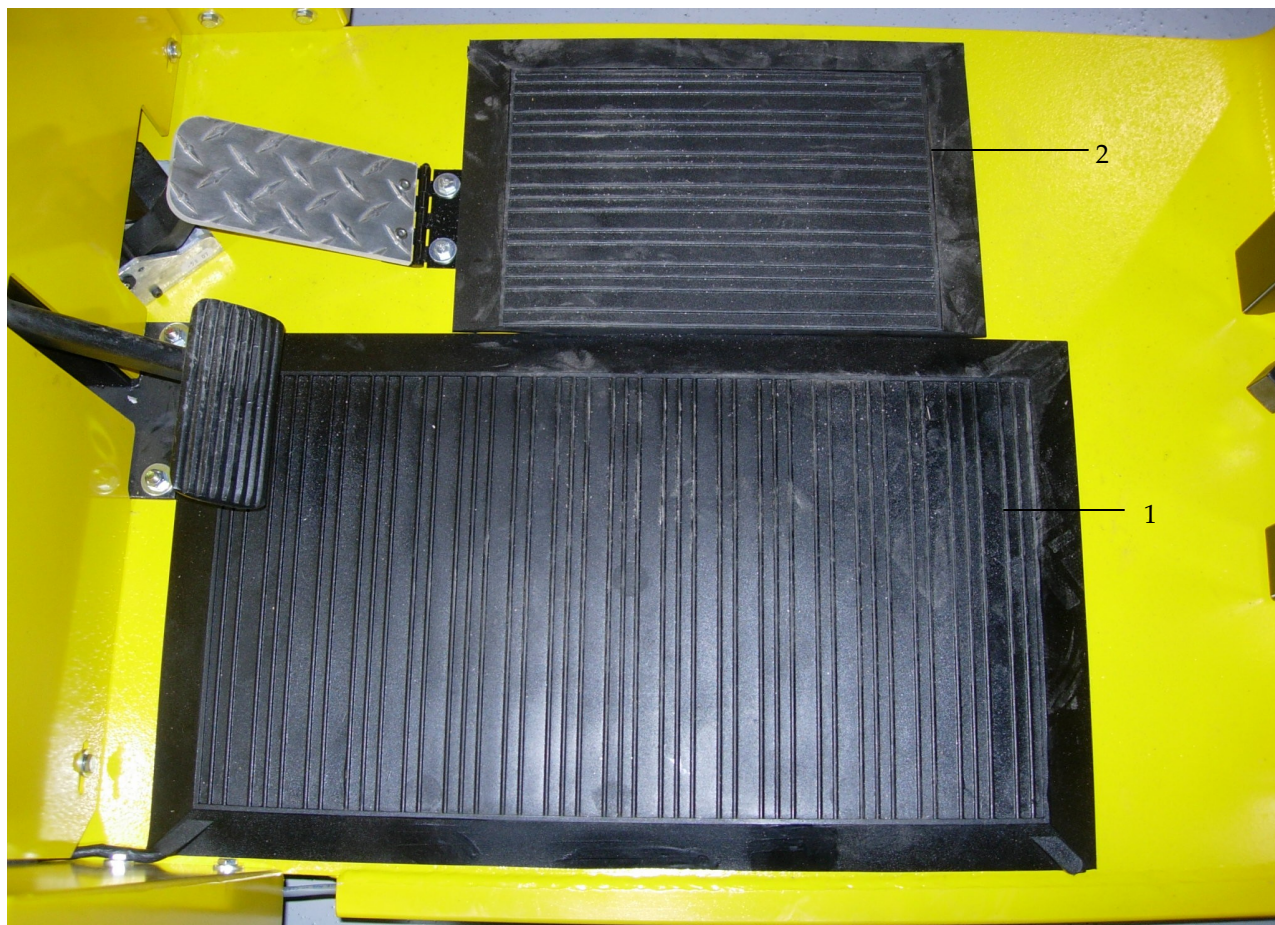


CHASSIS COMPONENTS



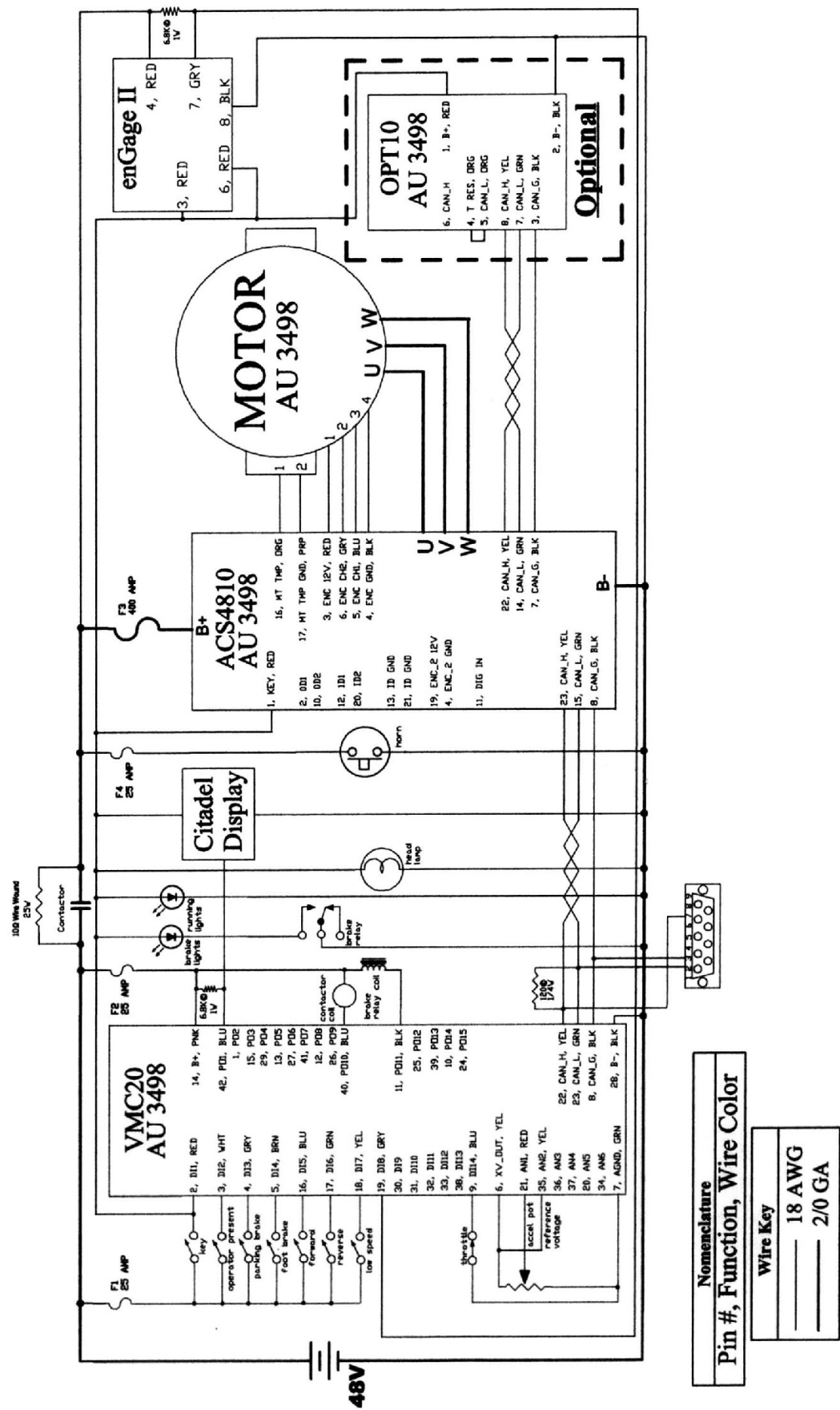
Item	Part Number	Qty	Description
1	A-RTT12E-00300-L	1	TIRE ENCL ASSY-LEFT RTT18E
2	A-RTT12E-00300-R	1	TIRE ENCL ASSY-RIGHT RTT18E
3	A-RTT12E-00303	1	CENTER CONSOLE RTT18E
4	A-RTT18B-00379	1	STEERING COVER PLATE
5	A-RTT18B-00378	1	FRONT COVER PLATE STEERING
6	A-RTT18B-00380	1	CONSOLE BACK PLATE (NOT SHOWN)
7	A-RTT18B-00309	2	FRONT SIDE PANELS RTT12E (NOT SHOWN)
8	A-RTT18B-00304	2	BATTERY COVER PLATE
9	NPN	2	BATTERY HOLD-IN ANGLE PLATE

SWITCH MAT

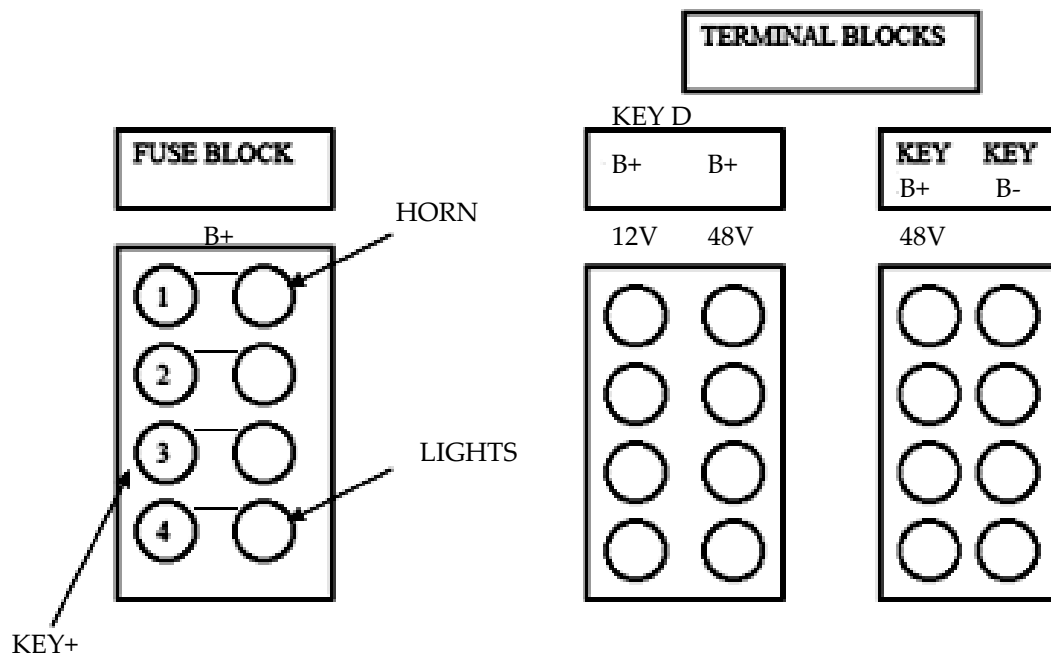
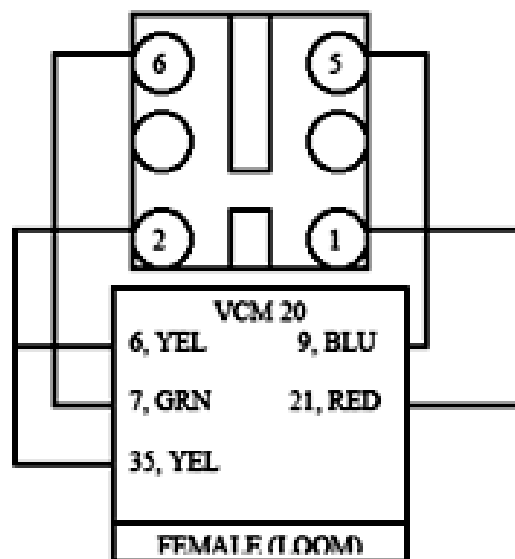
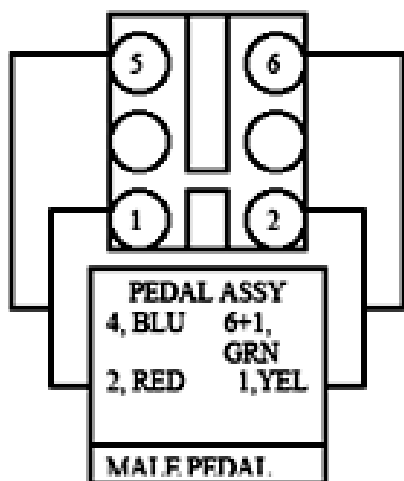


Item	Part Number	Qty	Description
1	A-RTT-00450	1	BILACK SWITCH MAT
2	A-RTT-00450 SPEC	1	BLACK SWITCH W/O SENSORS

WIRING DIAGRAM



WIRING DIAGRAM



REVISION LOG

Rev	Date	Description	Appr.
6	24-Oct-2013	Revised Beacon Pole Wiring	PRB
7	15-Nov-2013	Removed Warranty Statement, Updated electrical component assembly for RT00-82-001-KA pre-charge resistor	SEB
8	17-Dec-2013	Removed PM schedule from this document and established it as an appendix.	SEB
9	06-Aug-2014	Corrected part numbers of front caster parts.	SEB
10	29-Aug-2014	Added part numbers for front wheel bearing and seal.	SEB
11	17-Oct-2014	Updated front hitch option and front hitch arm part number.	PRB
12	21-Oct-2014	Updated front wheel, tire, and hub part numbers.	PRB
13	26-Nov-2014	Added front wheel/tire assembled part number	PRB
14	18-June-2015	Replaced seat assembly diagrams. Replaced axle service parts diagrams.	DCM
15	8-July-2015	Corrected VMC part number. Added mico master cylinder assembly information.	DCM

Table of Contents

Appendix A1 - RTT 2050 Compliant Preventive Maintenance	
Description	Page
Servicing Procedures	A1-2
Maintenance Schedule	A1-4
Revision Log	A1-5

Servicing Procedures

Periodic Maintenance

RTT-12E Electric Tractor – 2000 Key-on Hour* PM Schedule

1. Disconnect battery.
2. Unbolt battery covers and steering column cover as well as the battery cable.
3. Inspect battery and battery compartment for corrosion, clean and recoat as necessary.
4. Remove both front side inspection plates and properly pressure lubricate both U-Joint bearing as well as the steering shaft flange bearing lubrication points with lithium grease.
5. Remove center console cover (access to motor, power electronics and hydraulic brake system).
6. Disconnect and remove RFI computer (if installed).
7. Safely jack tractor up and insert (3) safety stands spaced with (2) under frame (below battery).
8. Remove the (5) wheel hub bolts on each wheel and remove tire & wheel.
9. Remove the left fender assembly (as viewed from the drivers forward position).
10. Verify Steering column clamp u-bolts are torqued at 10 ft. lbs.
11. Verify that steering shaft split collar screws are torqued to 14 ft. lbs.
12. Verify the steering gear box bolts are torqued at 45 ft. lbs.
13. Remove the front steered wheel assembly. Measure the diameter of the (single) black solid rubber front tire(s). If worn 1/4" (10.5" diameter down to 10.25" diameter), replace.
14. Remove front steered axle and visually inspect both tapered wheel bearings; replace hub and bearings if bearing races are scored or bearings show signs of wear (rough spinning, etc). Properly repack old or new bearings with Mobile SHC 32 grease or equal. Re-assemble.
15. Remove two 1/2-20 UNC x 10 bolts securing the rear axle rubber suspension springs.
16. Block up axle torque arms; unbolt RH & LH pillow block bearings and remove cross shaft. Visually inspect plastic flange bearings in torque arms and replace if worn in appearance. Re-assemble the shaft and pillow blocks to the torque arms and chassis, in reverse order of disassembly and torque pillow block bolts to 105 ft. lbs. Reinstall rubber suspension bolts.
17. Remove RH & LH hub and brake drum assembly. Inspect parking brake cables for broken cable strands and replace as required. Inspect wheel cylinders for seepage, brake shoes for excess wear and axle seal for seepage. Replace as indicated.
18. Re-install front side inspection plates, steering column cover and operator facing steering cover plate.
19. Visually inspect hydraulic brake master cylinder and brake line connections for leaking (to verify seepage you may need to use a flashlight). Tighten or replace as indicated. Fill brake fluid reservoir to between the Min/Max lines with Dot 3 (brake fluid) and bleed if necessary.
20. Check parking brake application and release, verify acceptable (20 pounds max to apply and release). Adjust lever knob and lock, as necessary.

Servicing Procedures

Periodic Maintenance—Cont.

RTT-12E Electric Tractor – 2000 Key-on Hour* PM Schedule

21. Visually check the power controller wiring harness for deterioration due to routing or connection. Repair or replace as indicated.
22. Re-install center console cover.
23. Re-connect battery cable.
24. Visually inspect that the battery green watering light is blinking and that the single point watering hose connections are tight. Continue inspection of battery leads (including 18 ga. Red and black wires) and terminal connectors (including ORC thermistor) for solid connection, arcing or corrosion. Repair or replace as indicated.
25. Visually inspect battery discharge display (BDI) & hour meter for operation. Replace if required.
26. Jack tractor up, remove the (3) safety stands and safely lower to floor.
27. Drain the axle completely of fluid using the axle drain plug. Clean any particles from the magnetic drain plug and replace.
28. Remove the RH and LH axle shafts. Replace outboard axle bearings (2) and oil seals (4). Re-install the axle shafts to the axle housing. Re-install the RH and LH hub and brake assemblies removed earlier.
29. Fill the axle with 27oz/.8L of API GL-5 85W-140 gear oil or equivalent. NOTE: the axle must be filled slowly to allow time for the oil to disperse. Once axle has been filled with oil, reinstall fill plug, lower the front of the truck and remove the tire chocks.
30. Clean accelerator module of any dirt and debris, paying special attention to the groove on top of the actuator arm. Check accelerator operation to verify operation within specification (accelerate when depressed, re-gen braking when released). Notify manufacturer local service rep if deviation is experienced.
31. Physically verify floor mat safety switch by stepping on accelerator with foot on pad. Tractor should move. If inoperative, diagnose wiring or mat replacement as indicated.
32. Clean horn switch brushes and slip rings. Apply dielectric grease and reassemble. Verify horn and turn operation key to on; the following observations should be—headlight-on, taillight-on and with directional control switch in F or R, parking brake-on vehicle won't move, parking brake-off normal operation. Check brake light operation by stepping on safety switch pad with directional control in F or R and step slightly on accelerator. Brake light dims to taillight when movement occurs. Repair or replace as necessary.
33. Check seat track for proper lubrication. Spray horizontal and vertical seat track with dry lubricant as needed.

Note: 33 point PM inspection/adjustment/lubrication time allocation — 8.5 man hours plus additional time for any repair or replacement.

* The 2000 hour interval should be performed every 2000 key-on hours or yearly, whichever comes first.

Maintenance Schedule (hours listed are key-on hours)

Preventive Maintenance Item	Every 500 hours	Every 1000 hours	Every 2000 hours*	Every 8000 hours
Inspect front steered wheel assembly including suspension springs			X	
Inspect front wheel bearing and re-pack with grease			X	
Inspect and grease steering shaft U-joints			X	
Inspect plastic thrust bearing for wear and apply grease			X	
Inspect front steered wheel axial load flange bearing for wear and apply grease			X	
Oil front steered wheel suspension pivot with light oil applied through the lube hole			X	
Inspect steering gear box			X	
Inspect steering U-joint set screws, clamp screws, and shaft collars			X	
Inspect steering column including tilt mechanism			X	
Verify steering wheel horn button functional			X	
Inspect battery cable plug - SBC350			X	
Inspect throttle assembly and clean of all debris including groove on actuator arm			X	
Inspect accelerator pedal wear pad and replace if wear is excessive			X	
Inspect suspension pillow blocks and verify smooth operation and apply grease			X	
Inspect suspension flange bearings and replace if necessary			X	
Inspect rear axle rubber springs			X	
Inspect rear drive tires and replace if wear is excessive			X	
Inspect parking brake cable assembly for damage or wear			X	
Verify safety switch mat functional			X	
Verify parking brake handle has smooth operation and adjust tension if necessary			X	
Verify parking brake switch functioning			X	
Verify direction rocker switch functioning			X	
Verify speed rocker switch functioning			X	
Verify on-off key switch functioning			X	
Verify beacon functioning			X	
Verify headlight functioning			X	
Verify LED taillight functioning			X	
Inspect master cylinder for leakage and boot wear			X	
Verify brake pressure switch functioning			X	
Verify brake relay functional			X	
Inspect RH and LH brake shoes and replace if excessively worn			X	
Inspect RH and LH brake wheel cylinders for leakage			X	
Inspect seat cushions and replace if excessively worn			X	
Inspect "E" hitch pin & spring. Replace hitch pin if excessively worn			X	
Replace LH drive axle bearing and two oil seals. Bearing substitutions not acceptable. Bearing retainer collar must be installed with minimum 1 ton press. Apply grease between axle seals.	X			
Replace RH drive axle bearing and two oil seals. Bearing substitutions not acceptable. Bearing retainer collar must be installed with minimum 1 ton press. Apply grease between axle seals.		X		
Drain and replace rear axle gear oil. Remove all particles from rear axle oil drain plug.	X			
Replace AC motor bearing				X
Inspect fuses on fuse blocks for blown or loose			X	
Inspect fuse on AC drive for loose			X	
Inspect all high voltage cables for crimp integrity and tight hardware			X	
Inspect precharge resistor for good connection to contactor			X	
Clean and grease horn brush contacts and slip rings, re-test horn			X	
Inspect brake pedal shaft set screws			X	

* The 2000 hour interval should be performed every 2000 key-on hours or yearly, whichever comes first.

Revision Log

Rev	Date	Description	Appr.
A	17-Dec-2013	PM schedule removed from RTT manuals and established as appendix.	SEB
B	13-Aug-2014	Added oiling of front wheel suspension to PM schedule.	PRB
C	20-Apr-2015	Changed axle oil viscosity and volume.	SEB
D	25-Sep-2015	Revised axle bearing replacement interval.	PRB

This page intentionally left blank.